RCS 03-811

EGLIN AIR FORCE BASE
Florida

NAVY PRE-DEPLOYMENT TRAINING AT EGLIN AFB, FLORIDA

FINAL ENVIRONMENTAL ASSESSMENT

FEBRUARY 10, 2004

Report Documentation Page

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FINDING OF NO SIGNIFICANT IMPACT

FOR

Navy Pre-Deployment Training
Eglin AFB, Florida
RCS 03-811

Pursuant to the Council on Environmental Quality Regulations for implementing the National Environmental Policy Act (NEPA) promulgated at 40 Code of Federal Regulations Part 1500 (40 CFR §§1500-1508), and Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process*, as promulgated at 32 CFR Part 989, the Department of the Air Force has independently evaluated and approved the scope and content of the EA, "Navy Pre-Deployment Training" (February 2004) prepared by the U.S. Navy and hereby adopts the EA as an Air Force environmental document insofar as the proposed action involves Air Force property or programs or requires Air Force approval.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The proposed action is to conduct up to two Composite Training Exercises (COMPTUEXs) and three advanced-phase Joint Task Force Exercises (JTFEXs) at Eglin AFB per year. The COMPTUEX and JTFEX would not necessarily be conducted concurrently. COMPTUEX training would require nine days of Eglin Range operations over a 10-calendar day period, with the majority of operations occurring during the second week. A JTFEX would require three days of Eglin Range operations over a three-calendar day period. Years in which two COMPTUEXs occur would require two nine-day periods of range operations; likewise, a JTFEX would require up to three three-day periods of range operations. It is possible that the training would occur only once during some years and not at all in others. COMPTUEX and JTFEX activities that would be conducted at Eglin are:

ACTIVITY	COMPTUEX	JTFEX
Integrated Strike	√	
Integrated Long Range Strike	√	√
Close Air Support (CAS)	√	
Combat Search and Rescue (CSAR)	√	
Haystack (Urban Targeting Operations)	√	
Unit Level Bombing	√	
Helicopter Unit Level Terrain Flight Training (TERF)	√	
Helicopter Squadron/Helicopter Squadron Light (HS/HSL) Helicopter Unit Level Air-to-Ground Training	√	

Alternative 1 (Conduct COMPTUEX Over 5-day Period)

Alternative 1 is similar in all respects to the proposed action, with the exception of the duration of the COMPTUEX training exercise. Under alternative 1, the COMPTUEX training exercise would occur over a 5-day period as opposed to nine days as described under the proposed action. Activities would maintain the same day-to-day intensity of training events described under the proposed action; however, the total number of training events would be minimized by roughly half due to the shortened duration of the exercise.

No-Action Alternative
Under the no-action alternative, baseline missions would continue at their present level and Navy pre-deployment training would not be conducted at Eglin.

ANTICIPATED ENVIRONMENTAL EFFECTS

Anticipated environmental effects involving socioeconomics, noise, safety, wetlands, floodplains and coastal zone, water quality, air quality, hazardous materials and solid waste, sensitive species, sensitive habitats, cultural resources and environmental justice are discussed in Chapter 4 of the EA.

MANAGEMENT REQUIREMENTS

Management requirements are discussed in Chapter 5 of the EA. The need for these requirements was identified by the environmental analysis and they were developed through cooperation between the proponent and the interested parties involved in the proposed action.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and the environmental analysis contained in the attached EA and as summarized above, I find the proposed decision of the Air Force to allow the U.S. Navy to conduct pre-deployment training at Eglin AFB, FL would not have a significant impact on the human environment insofar as the proposed action involves Air Force property or programs or requires Air Force approval. Therefore, an environmental impact statement is not required and will not be prepared by the Air Force.

10 Feb 04
DATE

CHRIS T. ANZALONE, Brig Gen, USAF
Vice Commander

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LIST OF ACRONYMS AND ABBREVIATIONS

16 SOW/CEV	16th Special Operations Wing
96 CEG/CESF	96th Civil Engineer Group, Fire Protection Flight
96 SFS	96 Security Forces Squadron
A/C	Aircraft
AAC	Air Armament Center
AAC/EMCE	Air Armament Center, Environmental Engineering
AAC/EMH	Air Armament Center, Historic Preservation Division
AAC/EMR	Environmental Management Directorate, Restoration Division
AAC/EMSN	Air Armament Center, Natural Resources Management
AAC/PA	Air Armament Center, Public Affairs Office
AAC/SE	Air Armament Center, Directorate of Safety
AAC/SEU	Air Armament Center, Range Safety Office
AACI	Air Armament Center Instruction
AAV	Amphibious Assault Vehicle
ac	acre
AFB	Air Force Base
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AGL	Above Ground Level
AGM	Air-to-Ground Missile
AGM-65E/F	Maverick Air-to-Ground Missile, Laser (E) and Infrared Guided (F)
AICUZ	Air Installation Compatible Use Zone Program
AQCR	Air Quality Control Region
ARG/MEU	Amphibious Ready Group/Marine Expeditionary Unit
ATSDR	Agency for Toxic Substances and Disease Registry
BA	Biological Assessment
BASH	Bird Aircraft Strike Hazard
BCF	Bioconcentration Factor
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
C2	Command and Control
CAA	Clean Air Act
CAS	Close Air Support
CBU	Cluster Bomb Unit
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHABA	Committee on Hearing, Bioacoustics, and Biomechanics
CNAFINST	Commander Naval Air Force Instruction
CO	Carbon Monoxide
COMPTUEX	Navy Composite Training Unit Exercise
CSAR	Combat Search and Rescue
CSEL	C-Weighted Sound Exposure Level for a Single Event
CSG	Carrier Strike Group
CVW	Carrier Air Wing
CY	Calendar Year
CZMA	Coastal Zone Management Act
dB	Decibel
dBA	A-Weighted Decibels
dBC	C-Weighted Decibels
dbh	Diameter at Breast Height
dBP	Maximum Acoustic Pressure in Decibels
DO	Dissolved Oxygen

LIST OF ACRONYMS AND ABBREVIATIONS CONT'D

DoD	Department of Defense
DOF	Division of Forestry
DOI	Department of the Interior
DPI	Direct Physical Impacts
DUD	Non-detonation
E/O	Electro-Optical
EA	Environmental Assessment
EMR	Electromagnetic Radiation
EO	Executive Order
EO/IR	Electro-Optical Infrared
EOD	Explosive Ordnance Disposal
EPCRA	Emergency Planning and Community Right-to-Know
ESA	Endangered Species Act
FAC	Florida Administrative Code
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FNAI	Florida Natural Areas Inventory
FONSI	Finding of No Significant Impact
FSU	Former Soviet Union
ft	Feet
FWC	Florida Fish and Wildlife Conservation Commission
FWRA	Florida Watershed Restoration Act
FY	Fiscal Year
GBU	Guided Bomb Unit
GCI	Ground Control Intercept
GIS	Geographic Information System
GOMEX	Gulf of Mexico
HAZMAT	Hazardous Materials
HE	High Explosive
HIB(s)	Heavy Inert Bomb(s)
HLZ	Helicopter Landing Zone
HMMWV	High Mobility Multi-Purpose Wheeled Vehicle
HMX	High Melting Explosive (hexamine, ammonium nitrate, nitric acid, and acetic acid)
HS/HSL	Helicopter Squadron/Helicopter Squadron Light
Hz	Hertz
ILRS	Integrated Long Range Strike
IR	Infrared
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
IS	Integrated Strike
JAX	Jacksonville
JDAM	Joint Direct Attack Munition
JTFEX	Joint Task Force Exercise
LAV	Land Assault Vehicle
lb	Pound(s)
LC_{50}	Lethal Concentration to Kill 50%
L_{Cdn}	Day-Night Average Noise Level associated with C-Weighted Noise
L_{dn}	Day-Night Average Sound Level
L_{dnmr}	Onset-Rate Adjusted Monthly Day-Night Average Sound Level
LGTR	Laser-Guided Training Round
LOAEL	Lowest Observable Effect Concentration

LIST OF ACRONYMS AND ABBREVIATIONS CONT'D

LZ	Landing Zone
M	Moles
meq	Milliequivalent
µg/L	Micrograms per Liter
µg/m^3	Micrograms per Cubic Meter
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
mg/m^3	Milligrams per Cubic Meter
MHz	Megahertz
mm	Millimeter
MOA	Military Operations Area
MR_NMAP	MOA Range NoiseMap
MSDS	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards
NAPS	Noise Assessment and Prediction System
NAS	Naval Air Station
N_D	Number of Events During Daytime
NEPA	National Environmental Policy Act
NEW	Net Explosive Weight
NEWT	Navy Expeditionary Warfare Training
NHPA	National Historic Preservation Act
N_N	Number of Events During Nighttime
NO_2	Nitrogen Dioxide
NOAEL	No Observable Adverse Effect Level
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Units
NWI	National Wetlands Inventory
O_3	Ozone
ºC	Degrees Celsius
OFW	Outstanding Florida Waters
OPAREA	Operational Area
OPFOR	Opposing Forces
OSHA	Occupational Safety and Health Act
Pb	Lead
PEA	Programmatic Environmental Assessment
PEP	Propellant, Energetic, and Pyrotechnics
pH	Measure of Acidity
PM_{10}	Particulate Matter With a Diameter Less Than or Equal to 10 Microns
$PM_{2.5}$	Particulate Matter With a Diameter Less Than or Equal to 2.5 Microns
POL	Petroleum, Oil, and Lubricant
ppm	Parts per Million
psi	Pounds per Square Inch
R&S	Reconnaissance and Surveillance
RCRA	Resource Conservation and Recovery Act
RCW	Red-cockaded Woodpecker
RDX	Research Department Explosive (1,3,5-Trinitro-1,3,5-triazacyclohexane)
RESOMS	Resource Scheduling and Operational Management System
RF	Radio Frequency
ROCC	Range Operations Control Center
ROR	Range-Only-Radar
ROW	Rest of the World
RUR	Range Utilization Report
SACEX	Supporting Arms Coordination Exercise

LIST OF ACRONYMS AND ABBREVIATIONS CONT'D

SAM	Surface-to-Air Missile
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
SPL	Sound Pressure Level
SR	State Road
SRBM	Short Range Ballistic Missile
SUA	Special Use Airspace
SWIM	Surface Water Improvement and Management Act
TA	Test Area
TERF	Helicopter Unit Level Terrain Flight Training
TLAR	Threat Transporter-Launcher and Radar
TMDLP	Total Maximum Daily Loads Program
TNT	2,4,6-trinitrotoluene
TOW	Tube Launched, Optically Tracked, Wire Guided
TP	Training Projectile
TRI	Toxic Release Inventory
TRI-DDS	Toxic Release Inventory-Data Delivery System
TSMO	Threat Simulator Management Office
TT	Test Target
U.S.	United States
ULB	Unit Level Bombing
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCHPPM	United States Army Center for Health Promotion and Preventive Medicine
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish And Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
WHO	World Health Organization

1. PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 PURPOSE FOR THE ACTION

The purpose of the Proposed Action is to maximize the Atlantic Fleet's depth of range resources for pre-deployment training in order to increase its flexibility to conduct training. The Navy owns and/or actively uses seven air-to-ground training ranges along the East Coast of the United States for training during each deployment cycle. Additional ranges owned and operated by the other military services are also used, including the ranges at Eglin Air Force Base (AFB), Townsend Range, Pinecastle Range, and Avon Park Air Force Range. Each air-to-ground range offers a different set of operational capabilities to test the skills of the training aircrews.

Utilizing the physical and operational attributes at an existing range, such as Eglin, helps meet the pre-deployment training requirements and needs of the Atlantic Fleet, and also develops a greater depth of resources and flexibility in training environments. An array of ranges with physical and operational differences accessible to Atlantic Fleet air forces from both the Jacksonville (JAX) and Gulf of Mexico (GOMEX) Operational Areas (OPAREAs) (launch, fly to target, deliver ordnance, and return to carrier) would improve/enhance existing and future training by increasing the combat realism of the training environment (i.e., different training environments and intensities of training). Ranges that differ in their geography, infrastructure, and size require the application of different tactics to achieve success in a combat situation and provide for multidimensional training. By adding to the number and types of ranges used (i.e., differing geography, features, and size), the variety of tactics and weapons that can be employed would expand. This would improve the quality of air-to-ground training by avoiding pitfalls inherent in small numbers of highly predictable training scenarios. Increasing the number and types of ranges would also improve the quantity of training opportunities available to Naval air forces, which would aid in meeting routine and emergent training requirements. Depth in the number and quality of air-to-ground ranges available for pre-deployment training by the Atlantic Fleet would also benefit readiness by providing more than one scheduling option to complete required training when adverse weather conditions preclude use of any given air-to-ground range. A final benefit would be improvement in Naval Expeditionary Warfare interoperability with other Armed Services. Eglin AFB is an especially important range because of its accessibility from both the Atlantic and Gulf of Mexico (Figure 1-1), its large land area (724 square miles) with multiple ranges that are approved for air-to-ground delivery of explosive weapons, and its massive amount of military controlled airspace (131,000 square miles) over the Gulf of Mexico.

1.2 NEED FOR THE ACTION

To fulfill its statutory mission, the Atlantic Fleet needs combat-capable air, surface, and subsurface forces ready to deploy worldwide. Section 5062 of Title 10 of the United States Code (USC) directs the Chief of Naval Operations to organize, train, and equip naval forces for combat. Naval operations span the spectrum of armed conflict to humanitarian assistance. Atlantic Fleet air forces are strategically organized into Carrier Air Wings (CVWs) that deploy for six-month periods (or longer) with Carrier Strike Groups (CSGs).

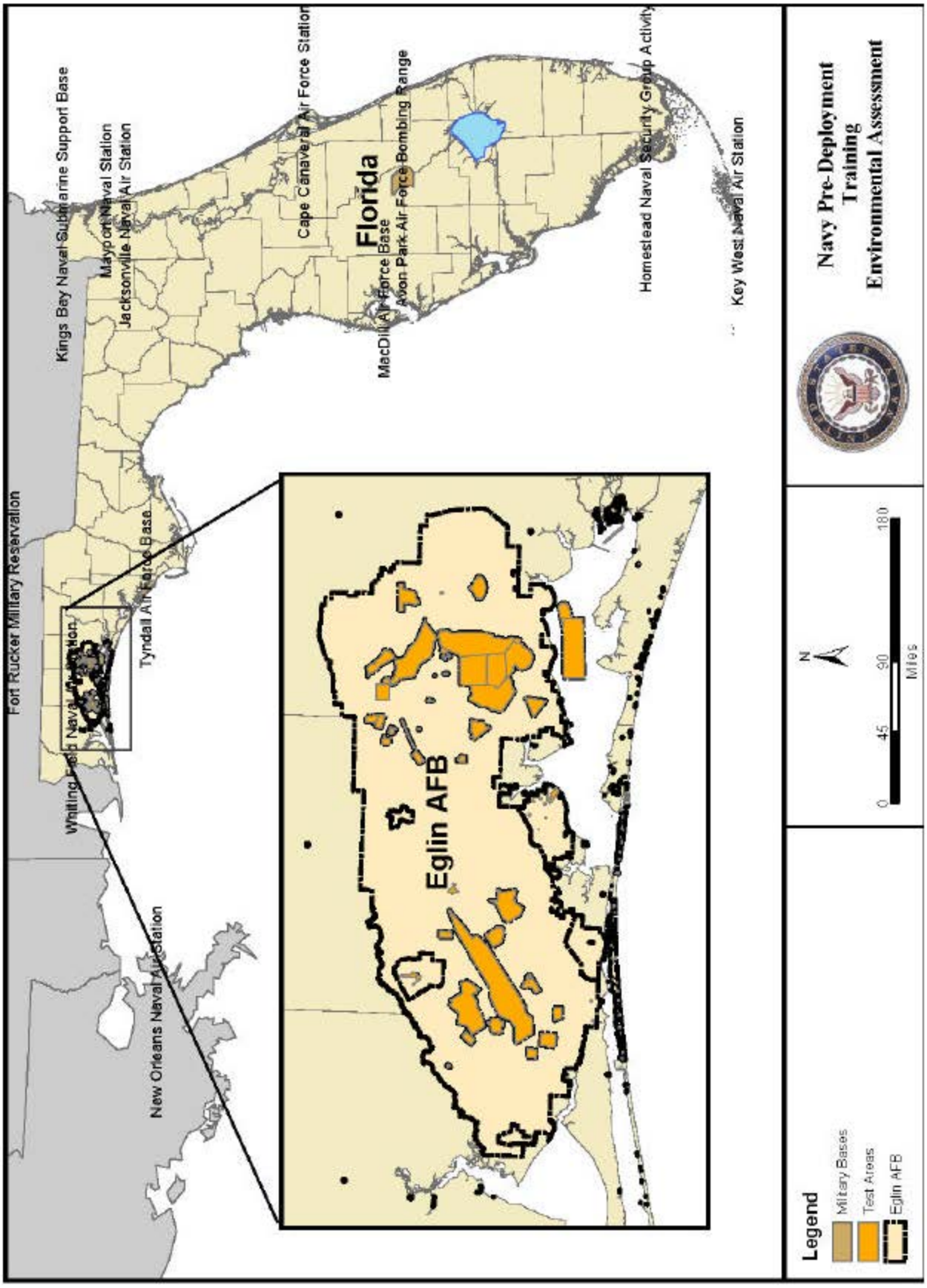

Figure 1-1. Regional Setting

While most deployments are scheduled long in advance, short-notice deployments often occur in response to world crises. The Atlantic Fleet's pre-deployment training program for these forces must therefore be sufficient to meet routine requirements yet remain flexible enough to react to contingencies and be adaptive to technological, tactical, and other changes in warfare.

Before Atlantic Fleet forces deploy, CVWs and CSGs must train to exacting standards. First, CVWs and CSGs (and their constituent parts) train separately, then together, so that they may achieve maximum effectiveness as an integrated force. Rigorous, realistic training is indispensable not only to achieving success in combat; it is essential to saving lives. The pre-deployment training prepares CVWs and CSGs according to the maxim "Train like you fight." It is designed to test Naval forces under controlled but demanding conditions that enable them to develop proficiency with systems, operating procedures, and tactics, and thereby master critical war-fighting skills. From experience, the Navy has learned that it needs to prepare combat forces under physical and psychological demands similar to those encountered in the heat of battle. A key aspect of this preparation is the use of explosive ordnance.

The Navy considers training with explosive ordnance to be indispensable to achieving and maintaining combat readiness. Training with explosive ordnance introduces physical and psychological dimensions to the training that cannot be simulated using non-explosive ordnance or computer simulation. Moreover, the use of explosive ordnance aboard an aircraft carrier is an essential part of the end-to-end weapons delivery process. This process includes ordnance breakout, buildup, and loading; aircraft launch, weapons release and impact; and aircraft return. The end-to-end process provides for recurring weapons delivery training that ensures that each critical step in this process is taught properly, and it ensures that the CVW can conduct combat mission tasks safely and efficiently. In the end, tactical pilots and flight officers must have full confidence in their support personnel, their equipment and weapons systems, and their ability to safely and effectively prosecute difficult targets.

Every military activity short of all-out war involves some use of simulation. While simulation can be used to enhance combat performance, it cannot replace the reality of live (explosive) fire. Existing technology simply cannot effectively simulate the complex, sequential series of procedures associated with preparing and launching bombs, and then assessing the results. Likewise, the handling and use of explosive ammunition—the danger, noise, shock, and visual effects associated with the impact of explosive ordnance—evoke a physical reaction which simulation cannot replicate.

The ability to utilize Eglin's range and its air-to-ground range assets with accessibility from both the JAX and GOMEX OPAREAs, along with its necessary physical and operational attributes, would provide depth and flexibility in training environments to support the pre-deployment training needs of the Navy. This would help to ensure a timely and continuous supply of CVWs and CSGs ready to deploy.

Key physical and operational elements needed for the enhancement/support of training that are available at Eglin include:

- Diversity of targets and aircraft attack headings;
- Proximity to existing CSG training locations in the Gulf of Mexico and off the East Coast of the United States;
- Suitably sized special use airspace (SUA) for maneuverability and standoff;
- Sufficient land area (controlled by DoD) to accommodate safe aircraft operations and ordnance delivery;
- Favorable weather conditions; and
- Authorizations for HE (high explosive) ordnance (per CNAFINST 3500.00, 20 August 2002).

Consequently, the ability to use Eglin's range with its necessary physical and operational attributes would increase the overall depth of East Coast range resources available to Atlantic Fleet CSGs during pre-deployment training. This would result in improved/enhanced existing and future training by increasing the combat realism of the training environment and would provide flexibility in achieving maximum training days while at sea. The survivability of aircrews during combat requires that aircrews must train as they intend to fight; therefore, the pre-deployment training environment must be intensive, realistic, unpredictable, and must stimulate the same physical and psychological reactions to stress that are imposed during the heat of battle. When adverse weather or other conditions preclude use of an air-to-ground range, the Navy needs the flexibly to schedule and direct training to another range with the physical and administrative attributes necessary to replicate combat conditions, otherwise training days and/or training quality are potentially lost.

1.3 PROPOSED ACTION

The Proposed Action is to conduct Navy Pre-Deployment Training at Eglin AFB.

1.4 PRIOR SIMILAR ACTIVITIES AT EGLIN AIR FORCE BASE

Activities on the Eglin range routinely involve the use of explosive ordnance and aircraft operations during both testing and training events. In addition to Air Force usage of the Eglin Range, the U.S. Navy and U.S. Marine Corps have previously conducted training events at Eglin that are similar in scope to the Proposed Action. In March of 2000, a component of Composite Training Unit Exercise/Joint Task Force Exercise (COMPTUEX/JTFEX) pre-deployment training was conducted at Eglin AFB. The surge component training requirement of expending the entire explosive ordnance complement of a carrier was met by expending 250 explosive Mk-82s in one day at Eglin AFB. Since the March 2000 event, two other COMPUTEX/JTFEXs, for the *Enterprise* and *George Washington* CSGs, utilized the Eglin range. In December of 2003, the U.S. Navy and U.S. Marine Corps conducted an Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) training exercise at Eglin that included the use of explosive ordnance.

1.5 POTENTIAL ENVIRONMENTAL ISSUES

Socioeconomics

Socioeconomics addresses the potential for positive and negative impacts to the local economy, tourism, environmental justice, and restricted access.

Restricted Access

Restricted access is defined as an increase or addition in restricted area and/or an increase or addition to the frequency of access restriction to public areas as a result of mission use. Restricted access issues associated with the Proposed Action include the potential for an increase in restricted access to recreational areas for the public resulting from COMPTUEX/JTFEX training activities.

Noise

The Proposed Action has the potential to increase the noise levels of Eglin and surrounding communities. Potential adverse impacts could be associated with increases in noise levels above established annoyance and health thresholds. Noise is assessed from several sources, with each activity analyzed separately. Explosive ordnance is the primary driver for noise impacts analysis.

Safety

Public safety would be primarily protected through established procedures and restricted access to hazardous areas and activities. Safety issues associated with the Proposed Action are related to impacts to military personnel associated with the presence of unexploded ordnance (UXO) on the Eglin Reservation and establishment of safety footprints associated with the use of explosive munitions and other training activities. The Proposed Action has inherent safety hazards associated with the impact and detonation of explosive munitions that would be used during COMPTUEX and JTFEX exercises. It should be noted that all munitions would be used on established live-fire test areas and training would be performed in accordance with Eglin's range operating procedures and in coordination with Eglin's safety office.

Wetlands

Federal agencies are required to analyze the impacts of their actions on wetlands. Wetlands are dominated by plants adapted to anaerobic substrate conditions imposed by saturation or inundation for more than 10 percent of the growing season. Wetlands have the potential to be impacted by inert or explosive munitions.

Floodplains and Coastal Zone

Federal agencies are required to evaluate the effects of potential actions on floodplains. This includes floodplain delineation and alternatives for actions that occur in floodplains that would increase the risk of flood loss; impact human safety, health, and welfare; and affect the natural and beneficial values served by floodplains. The Proposed Action would not occur in a floodplain.

Water Quality

Federal agencies are required to evaluate the effects of potential actions on water quality. Water quality issues are associated with the potential for the Proposed Action to impact the quality of surface waters on Eglin and within the local community. Water quality impacts are anticipated to be minimal since most targets are located well away from surface waters.

Air Quality

Air resources pertain to the potential for actions to impact local air quality (based on air quality criteria established by the U.S. Environmental Protection Agency), potentially resulting in negative health effects to both humans and wildlife. Air emissions from a variety of sources have the potential to impact air quality.

Soils/Erosion

Impacts to soils are a minor concern since most soil disturbance would occur on actively used test areas.

Hazardous Materials (HAZMAT)/Solid Waste

Potential impacts are associated with actions that (1) require use of hazardous materials, the generation and disposal of hazardous wastes, and (2) carry the potential for these substances to increase or decrease safety/health risks to military personnel and the public.

Sensitive Species

The Proposed Action has the potential to impact species protected under federal and state law. Important issues with the Proposed Action are noise impacts to red-cockaded woodpeckers (RCWs) and the potential for species to be directly struck by a munition or fragments.

Sensitive Habitats

Sensitive habitats refer to high-quality plant communities and wetlands. The Proposed Action has the potential to impact sensitive habitats, in particular RCW cavity trees. Eglin ecological monitoring data have shown that RCW habitat can be susceptible to wildfires (U.S. Air Force, 2003).

Cultural Resources

Cultural resources include historical and archaeological sites. Cultural resource sites are present near some of the test areas proposed for use and could be affected by explosive or nonexplosive ordnance.

Environmental Justice

A preliminary screening of census tract data surrounding the action areas for the Proposed Action has determined the presence of low-income or minority communities near the Eglin Reservation. Environmental justice impacts from COMPTUEX/JTFEX activities under the Proposed Action would occur if these communities were disproportionately impacted.

1.6 ISSUES NOT CARRIED FORWARD FOR FURTHER ANALYSIS

Electromagnetic Radiation

Military operations involving electromagnetic radiation (EMR) and lasers are not anticipated to have an impact on anthropogenic resources due to safety measures employed by the Air Force. Potential EMR impacts were analyzed in the *Electromagnetic Radiation Final Programmatic Environmental Assessment (PEA)* (U.S. Air Force, 2002). Analysis showed that, due to the safety considerations incorporated into the operation of these devices, the potential for impacts to humans are unlikely. Additionally, based on the configurations of the radars, lasers, and microwave devices that are used, impacts to biological resources are anticipated to be low to zero. The devices are either oriented too high to impact land-based biological resources, or do not focus on any one area long enough to cause permanent damage to airborne biological resources such as birds. The likelihood that EMR would impact biological resources is represented by the probabilities displayed in Table 1-1:

Table 1-1. Probability of a Radar Beam Bird Strike within a Given Hazard Area

Bird Size	Radar System	Hazard Area (feet)	Chance of Beam Contact	Probability of Occurrence
25 grams	AN/FPS-16	1,198	0.0046%	1 in 21,739
3.5 kilograms	AN/FPS-16	946	0.0046%	1 in 21,739

Time averaging is an important aspect in determining whether a bird may be exposed to hazardous levels of EMR. The average maximum time of exposure in relation to hazardous levels of EMR is six minutes. Thus, for a 25-gram bird to experience a hazardous exposure to EMR it would have to hover within the beam or fly directly along the beam path for a duration of six minutes (U.S. Air Force, 2002).

More detailed information may be found in the EMR PEA. As a result of previous analysis and the apparent improbability that electromagnetic radiation would negatively impact environmental resources, no further analyses were conducted. Ground disturbance activities associated with the placement of mobile emitters and potential impacts are discussed in the Sensitive Habitats section of Chapter 4.

1.7 CONSULTATION AND PERMITTING REQUIREMENTS

Endangered Species Act

An informal Section 7 consultation per the Endangered Species Act (ESA) would be required with the U.S. Fish and Wildlife Service (USFWS) to address impacts to threatened and/or endangered species.

National Historic Preservation Act

A formal Section 106 consultation with the State Historic Preservation Officer (SHPO) is required for this action. Consultation with the SHPO is necessary; however concurrence is expected before need date.

Water Resources/Quality Permitting

No water resources/water quality permits are required for this action.

Coastal Zone Management Act Consistency Determination

The action occurs on federal property and within federal airspace and water jurisdictions. This action is consistent with respect to Florida's Coastal Zone Management Plan under the Federal Coastal Zone Management Act (CZMA).

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION (PREFERRED ALTERNATIVE)

2.1.1 Proposed Action Summary

Proposed Action

The Proposed Action is to conduct up to two COMPTUEXs and three advanced-phase JTFEXs at Eglin AFB per year. The COMPTUEX and JTFEX would not necessarily be conducted concurrently. COMPTUEX training would require nine days of Eglin Range operations over a 10-calendar day period, with the majority of operations occurring during the second week. JTFEX would require three days of Eglin Range operations over a 3-calendar day period. Years in which two COMPTUEXs occur would require two 9-day periods of range operations; likewise, JTFEX would require up to three 3-day periods of range operations. It is possible that the training would occur only once during some years and not at all in others.

This Environmental Assessment (EA) will assess the impacts associated with training occurring at the maximum level, with the understanding that it may occur less frequently.

COMPTUEX

During a 10-day COMPTUEX training period, there are eight proposed training activities.

- Integrated Strike
- Integrated Long Range Strike
- Close Air Support (CAS)
- Combat Search and Rescue (CSAR)
- Haystack (Urban Targeting Operations)
- Unit Level Bombing
- Helicopter Unit Level Terrain Flight Training (TERF)
- Helicopter Squadron/Helicopter Squadron Light (HS/HSL) Helicopter Unit Level Air-to-Ground Training

***Integrated Strike*:** This exercise involves numerous aircraft launched from carrier ships in the Gulf moving towards targets located on the Eglin Reservation. Opposing Forces (OPFOR) aircraft would launch from Naval Air Station (NAS) Pensacola to provide simulated opposition to strike fighters. Once simulated aerial target engagement occurs, both nonexplosive and explosive ordnance (Figures 2-1 and 2-2) would be delivered on designated targets on the Eglin Range complex.

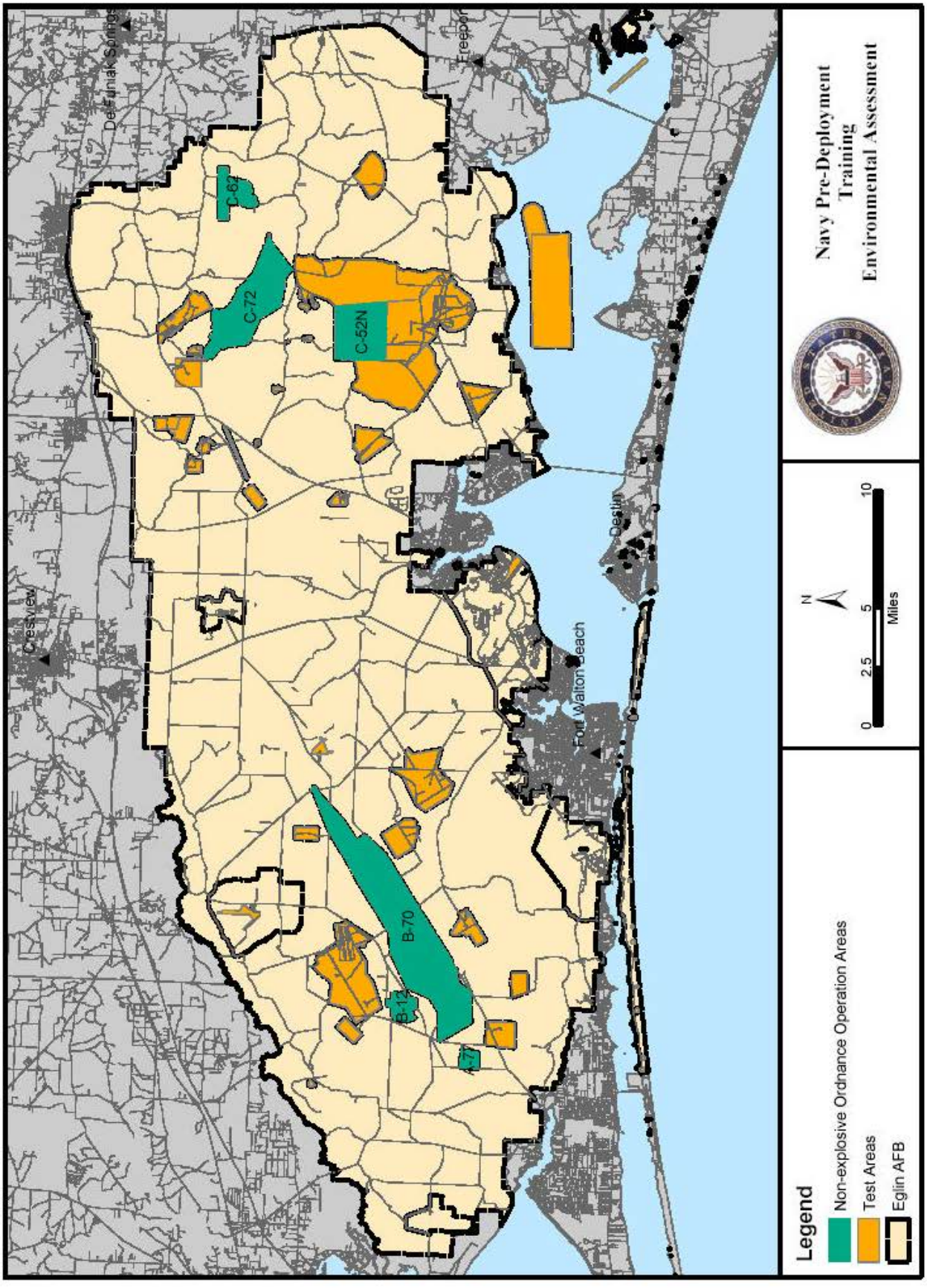

Figure 2-1. Proposed and Alternative Nonexplosive Ordnance Use Areas

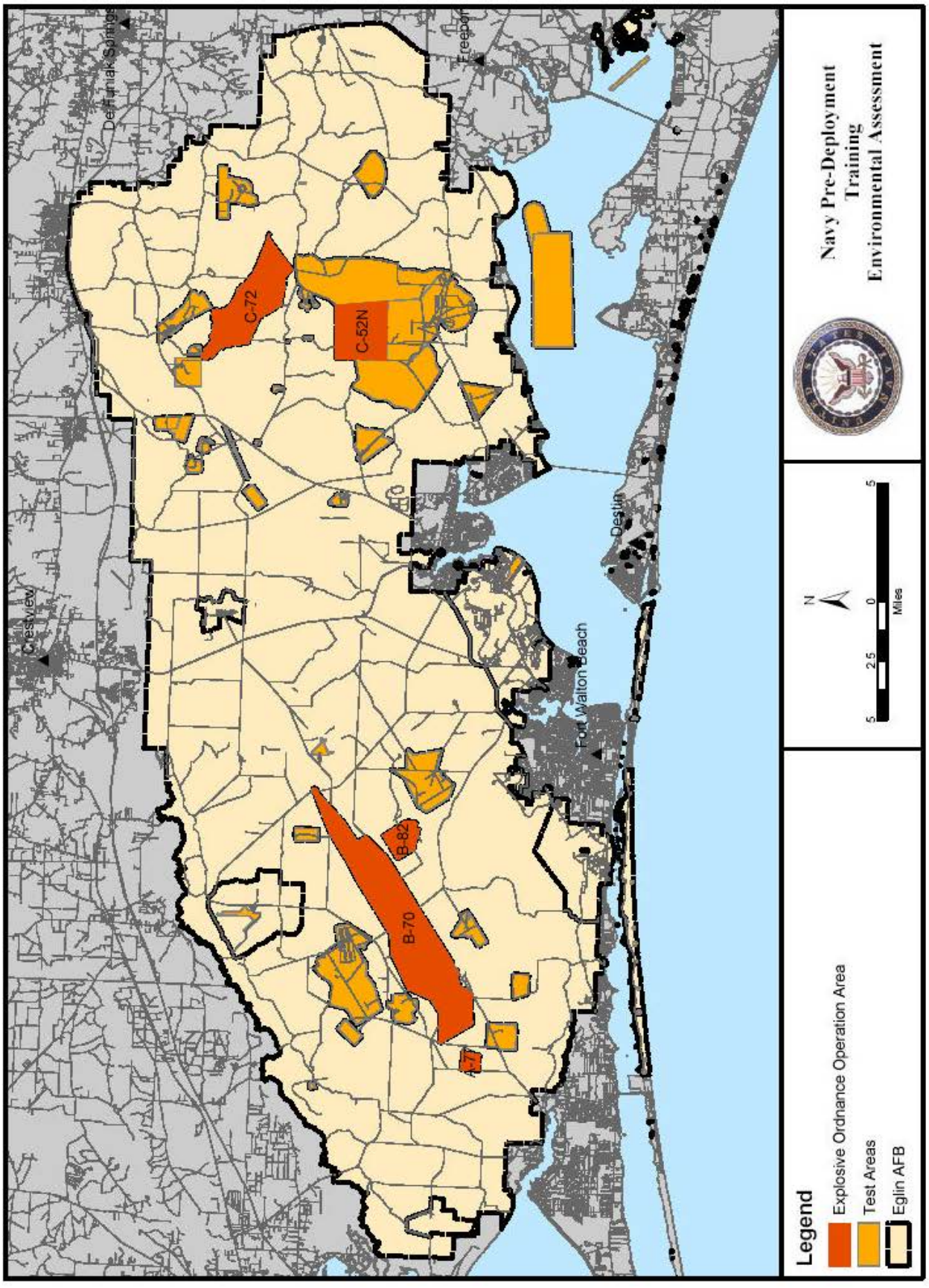

Figure 2-2. Proposed and Alternative Explosive Ordnance Use Areas

Number of Events: 25 over 9 days; 8 nighttime, 17 daytime
Number of Sorties: 400-550 (350 carrier-based, 50-150 shore-based)
Mission Size: 4-16 carrier-based aircraft (A/C), 2-6 shore-based A/C
Aircraft Employed: F-14, FA-18, E2 Hawkeye, EA6B Prowler, and various OPFOR
Eglin Airspace Use: W-151, R-2914A/B, R-2915A/B/C
Ordnance Delivery Locations: Explosive – C-52N, B-70, B-82 (Rockeye); Nonexplosive – B-12, C-72, C-62

***Integrated Long Range Strike*:** Similar to the Integrated Strike exercise described above, this exercise would occur only when the COMPTUEX originates from the east coast. Aircraft would originate from carriers in the Atlantic Ocean, cross central Florida entering Eglin's Gulf of Mexico airspace (Figure 2-3), and move north to deliver ordnance at targets (Figures 2-1 and 2-2) on the Eglin Reservation.

Number of Events: 4 over 4 days
Number of Sorties: 64 carrier-based; 24 OPFOR land-based
Mission Size: 4-16 carrier-based A/C, 2-6 shore-based A/C
Aircraft Employed: F-14, FA-18, E2 Hawkeye, EA6B Prowler, and various OPFOR
Eglin Airspace Use: W-470E, W-151A/B, R-2914A/B, R-2915A/B/C
Ordnance Delivery Locations: Explosive – C-52N, B-70; Nonexplosive – B-12, C-72, C-62

***Close Air Support (CAS)*:** CAS exercises involve the use of aircraft and air delivered ordnance to supply cover fire and engage targets identified by forward air controller ground troops.

Number of Events: 6 over 9 days
Number of Sorties: 4-100/day (may involve a random number of events per day)
Mission Size: Scenario dependent, but typically 2-8 A/C
Aircraft Employed: F-14, FA-18, E2 Hawkeye, EA6B Prowler, and various noncarrier-based fixed or rotary wing A/C
Eglin Airspace Use: W-151, R-2915A/B/C, R-2914A/B
Ordnance Delivery Locations: Explosive – C-52N, B-70; Nonexplosive – C-72, C-62, B-12, B-70

***Combat Search and Rescue (CSAR)*:** CSAR exercises involve the use of both fixed wing and rotary wing aircraft to locate and recover simulated downed or injured troops. "Downed" troops are located and, while gun ships provide cover fire against simulated OPFOR, are recovered and transported via helicopter to ships in the Gulf. This exercise may involve the use of ordnance such as training rounds, .50 caliber and pyrotechnics.

Number of Events: 3-5 over 4 days; half occurring at night
Number of Sorties: 30-48 CSAR aircraft; 30-48 OPFOR
Mission Size: 8-10 CSAR, 2-4 OPFOR
Aircraft Employed: F-14, FA-18, AC-130, E2 Hawkeye, EA6B Prowler; H-60 and various noncarrier-based fixed or rotary wing A/C
Eglin Airspace Use: W-151, R-2915A/B/C, R-2914A/B, Wynnhaven Corridor
Action Locations: Access to various established Helicopter Landing Zones (HLZs) including but not limited to B-12, B-6, and Samson HLZ.

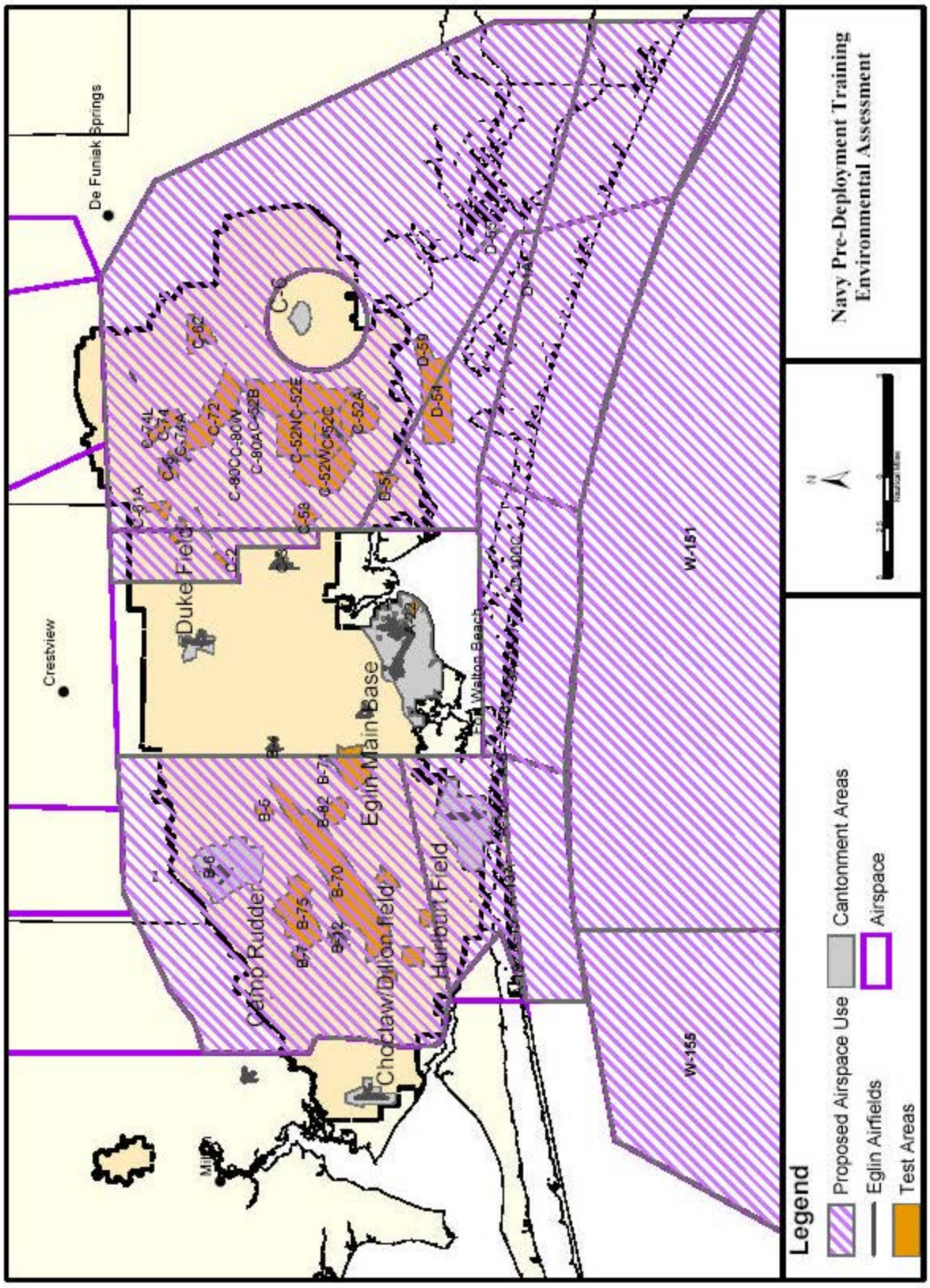

Figure 2-3. Proposed Military Airspace Use

***Haystack*:** Haystack missions are designed to train aircrews in an urban targeting environment. Aircrews are tasked with executing a simulated ordnance delivery against targets in developed landscapes and with providing flyover video of the attacks. The Tyndall Military Operations Area (MOA) would be utilized from 10,000 to 18,000 feet.

Number of Events: 25 over 6 days
Number of Sorties: 50
Mission Size: 2 aircraft
Aircraft Employed: F-14, FA-18
Eglin Airspace Use: W-151

***Unit Level Bombing*:** This exercise involves the training of aircrews in the delivery of ordnance against targets using several different delivery tactics (e.g., different altitudes, level and dive, etc.). Each mission could expend light nonexplosive, heavy nonexplosive, 20 mm strafe, or explosive ordnance (Figures 2-1 and 2-2). In addition, up to four Maverick missile shots would be completed by aircraft on Eglin AFB.

Number of Events: 25-50 over 6 days
Number of Sorties: 100
Mission Size: 2-4 aircraft
Aircraft Employed: FA-18, F-14, S-3B
Eglin Airspace Use: W-151, R2914A/B, R2915A/B/C
Ordnance Delivery Locations: B-12, A-77, A-78, C-62, C-52N, B-82 (Rockeye), B-70 (Maverick)

***Helicopter Unit Level Terrain Flight Training (TERF)*:** This exercise is meant to provide aircrews low-level flight training over various terrains. Flights are typically at 500 feet above ground level (AGL) and below. Helicopters would originate from a carrier in the Gulf, proceed through Eglin airspace (Figure 2-3) to the mainland reservation for low-level flight training involving landings on pre-surveyed HLZs, and then return to the carrier.

Number of Events: 12 over 6 days; 8 nighttime, 4 daytime
Number of Sorties: 24
Mission Size: 2 aircraft
Aircraft Employed: H-60
Eglin Airspace Use: W-151, Wynnhaven Corridor, R2914A/B, R2915A/B/C
Action Locations: Access to various established Helicopter Landing Zones (HLZs) including but not limited to B-12, B-6, and Samson HLZ.

***HS/HSL Helicopter Unit Level Air-To-Ground Training*:** This exercise involves the delivery of explosive rotary aircraft gunnery ordnance (e.g., 7.62 mm and .50 caliber) against specified targets. Additionally, 1 to 2 Hellfire missile shots could occur against tactical (moving) targets.

Number of Events: 12 over 9 days; 6 nighttime, 6 daytime
Number of Sorties: 12
Mission Size: 1 aircraft
Aircraft Employed: H-60
Eglin Airspace Use: W-151, Wynnhaven Corridor, R2914A/B, R2915A/B/C
Ordnance Delivery Locations: A-77, A-78, C-72 (Hellfire)

JTFEX

During a 3-day JTFEX training event there is one proposed training activity.

- Integrated Long Range Strike

***Integrated Long Range Strike*:** Similar to the Integrated Long Range Strike exercise for COMPTUEX, this exercise would originate from the east coast. Aircraft would originate from carriers in the Atlantic Ocean, cross north Florida, and enter Eglin airspace (Figure 2-3) over the mainland reservation to deliver ordnance at targets (Figures 2-1 and 2-2) on the Eglin Reservation.

Number of Events: 3 over 3 days
Number of Sorties: 30
Mission Size: 10
Aircraft Employed: F-14, FA-18, E2 Hawkeye, EA6B Prowler, various OPFOR
Eglin Airspace Use: W-470E, W-151A/B, R-2914A/B, R-2915A/B/C
Ordnance Delivery Locations: Explosive – C-52N, B-70; Nonexplosive – B-12, C-72, C-62

Threat System and Electronic Warfare Support Requirements

Both the COMPTUEX and JTFEX would require the use of ground support and threat radar/simulator systems and communications equipment to support these exercises. The equipment utilized would be a combination of existing equipment on the Eglin Reservation and equipment acquired specifically for the exercises (i.e., brought in by the Navy). Radars and communications equipment would be a combination of both fixed and mobile. Specific types of systems to be utilized would be scenario-dependent, but would fall under the following general categories.

- Early warning/acquisition radar systems capable of providing acquisition data to surface-to-air threat systems
- Short to medium range surface-to-air threat radar systems providing search and track capability
- Medium range surface-to-air threat radar systems providing search and track capability and integrated Command and Control of selected systems
- Mobile Threat Emitters (The Navy would bring in up to six mobile threat simulators.)

Examples of typical threat system radars that may be used during the exercises are described in Table 2-1. The Navy would contact the Eglin Radiation Safety Officer to discuss the use of radars not previously approved for use on Eglin ranges.

Table 2-1. Examples of Typical Threat System Radars used for COMPTUEX/JTFEX

Threat System	Radar	Description	Wheeled or Tracked
Surveillance	LONG TRACK	Actual Former Soviet Union (FSU) E-band, long-range acquisition radar capable of supporting ground control intercept (GCI) and target early-warning modes of operations.	Tracked
	THINSKIN	Actual FSU E-Band height-finder radar that can be integrated with LONGTRACK and the PU-12 to provide three-dimensional target information to TSMO's threat air defense systems.	Wheeled
	Giraffe 75	Swedish manufactured pulse Doppler G-Band radar with an integrated C3I function mounted on a five-ton carrier.	Wheeled
	XMTAS	Simulates a Russian SNOWDRIFT acquisition radar. Operating in the F and G bands, the XMTAS provides 3-dimensional target information to threat air defense systems simulated by TSMO's XM11S and XM15S.	Tracked
Command and Control	BTR-60PU-12	Actual FSU mobile threat command and control (C2) system that supports short- and medium-range air defense systems. Features include integrated FM data links and communications equipment operating in the HF and VHF frequency bands.	Wheeled
	XMAC3S	The XMAC3S is an advanced mobile threat command, control and communications system that supports short- to medium-range air defense systems. The integrated data links and communications equipment consist of 9 VRC-94 frequency-hopping radios, which operate, in the VHF and UHF frequency bands. The XMAC3S simulates the Russian MP-22, MP-23, MP-25, and RANGIR C3 systems. May be employed to represent rest of the world (ROW) C3 systems.	Wheeled
Radio Frequency (RF) Surface to Air	XM04S	Simulates an FSU SA-4 PAT HAND target tracking radar. The PAT HAND is a long-range threat surface-to-air missile system radar that operates in the D and H bands.	Tracked
	SA-6 System GAINFUL	Actual mobile FSU SAM system that provides medium range air defense against low- and medium- altitude aircraft. Integrated target acquisition, track, and illuminator radars operate in the G and H bands. Incorporates an E/O target tracking capability.	Tracked
	SA-8	Actual mobile FSU SAM that provides air defense against short- to medium-range aircraft. Integrated target acquisition, track, and missile guidance radars operate in the H and J bands. Incorporates an E/O target tracking capability.	Wheeled
	XM11S	Simulates the Russian SA-11 TELAR, a medium-range SAM. Provides air defense against low- and medium-altitude aircraft. Integrated acquisition, track, and target illumination radars operate in the H band. Incorporates an E/O target tracking capability.	Tracked
	ZSU-23-4 *SHILKA*	Actual FSU self-propelled 23 mm short-range antiaircraft artillery gun system with an integrated fire-control radar. The radar operates in the J band and has target acquisition and target track modes of operation. Incorporates an independent E/O target tracking capability.	Tracked
	2S6 *TUNGUSKA*	Actual FSU self-propelled 23 mm short-range antiaircraft artillery gun system with an integrated fire-control radar. The radar operates in the J band and has target acquisition and target track modes of operation. Incorporates an independent E/O target tracking capability.	Tracked

Table 2-1. Examples of Typical Threat System Radars used for COMPTUEX/JTFEX Cont'd

Threat System	Radar	Description	Wheeled or Tracked
	XM15S	Simulates a threat transporter-launcher and radar (TLAR) associated with the Russian SA-15 SAM system. The system provides air defense against low- and medium-altitude aircraft. The integrated acquisition, track, and missile-guidance radars operate in the H and J frequency bands. Incorporates an E/O target tracker.	Tracked
	ROLAND	The TSMO Euromissile ROLAND presents a "GRAY" threat mobile, short-range, low-altitude surface-to-air all-weather missile system. System consists of D band target acquisition and J band target tracking radars. E/O system consists of the gunner's sight and a missile guidance uplink.	Wheeled
	XM21 (Targets only)	Visually replicates the Russian SS-21 surface-to-surface missile system used as a target to represent SCUD-type systems. The missile is transported by a 6X6 transporter-erector-launcher vehicle. It is protected within the hull of the vehicle and only raised for launching.	Wheeled
	SCUD-B	FSU surface-to-surface missile system used as target SCUD-B type systems. The missile is transported by a MAZ-543 transporter-erector-launcher vehicle. It is protected within the hull of the vehicle and only raised for launching.	Wheeled
Infrared (IR) Surface to Air	XM07S	Replicates the FSU SA-7, a shoulder-fired, manportable, IR SAM. The SA-7 is designed to engage low-flying fixed- and rotary-wing aircraft.	N/A
	XM14/16S	Replicates the SA-14 and the SA-16, two separate shoulder-fired manportable threat IR SAM systems. Each progression in numbering represents an improvement in threat system performance.	N/A
	SA-9	Actual mobile FSU SAM system that provides short-range air defenses against low-altitude aircraft. The system incorporates four electro-optical/infrared (EO/IR) guided missiles packaged in individual canisters.	Wheeled
	SA-13	Actual mobile Russian SAM system with an integrated range-only-radar (ROR) operating in the K frequency band. The system incorporates four EO/IR guided missiles individually packaged	Tracked
	SA-18	A Russian shoulder-fired manportable threat IR SAM system. The system is designed to engage low-flying targets and hovering helicopters. Guidance is via two-channel cooled passive IR seeker, operating in the 1 to 2 and 3.5 to 5 micron wavelengths.	Wheeled
Short-range Ballistic Missile (SRBM) Surface to Surface	XM21 (Targets only)	Visually replicates the Russian SS-21 surface-to-surface missile system used as a target to represent SCUD-type systems. The missile is transported by a 6X6 transporter-erector-launcher vehicle. It is protected within the hull of the vehicle and only raised for launching.	Wheeled
	SCUD-B	FSU surface-to-surface missile system used as target SCUD-B type systems. The missile is transported by a MAZ-543 transporter-erector-launcher vehicle. It is protected within the hull of the vehicle and only raised for launching.	Wheeled
Electronic Warfare Systems	R-47 JAMMER	Bulgarian-manufactured manpack or vehicle-mounted VHF communications jammer designed to operate in the 20 to 100 MHz range.	N/A
	XM330ES	The XM330ES simulates the entire Russian R-330 radio-electronic combat system spectrum.	Wheeled

Tables 2-2 through 2-4 present the typical ordnance expendables for a COMPTUEX 9-day exercise, the total maximum sorties for such an exercise, and the maximum number of expendables, respectively.

Table 2-2. Typical Expendables per COMPTUEX (9-day event)

Mission	Explosive/ Nonexplosive	Ordnance													
		GBU-31/ Mk-84	GBU-32/16/ Mk-83 JDAM	GBU-12/ Mk-82	CBU-99/ Mk-20	LGTR	HIBs	Mk-76	Hellfire	Maverick	AGM-65E/F	7.62 mm	.50 Cal	20 mm	5.56 mm
IS	E	✓			⊗	⊗			⊗						
	NE					✓									
ILRS	E		✓		⊗	⊗			⊗						
	NE					✓									
CAS	E		✓		⊗	⊗			⊗					⊗	⊗
	NE					✓								✓	
CSAR	E		⊗			⊗			⊗						⊗
	NE					✓									✓
Haystack	E	⊗													
	NE														
ULB	E		✓		✓	⊗			⊗	✓		⊗		⊗	⊗
	NE				⊗	✓				⊗				✓	
TERF	E	⊗													
	NE														
HS/HSL	E		⊗						✓	⊗		✓		⊗	
	NE								⊗			⊗			

⊗ = Not used
✓ = Used
E = Explosive
NE = Nonexplosive

Table 2-3. Total Maximum Sorties per COMPTUEX (9-day event)

<table>
<tr><th rowspan="2">Mission</th><th colspan="2">Sorties Flown</th><th colspan="4">Airspace Used</th><th colspan="10">Test Area/Ground Location Used</th></tr>
<tr><th>Time</th><th>No.</th><th>W151</th><th>R2914 A/B</th><th>R2915 A/B/C</th><th>W470</th><th>B12</th><th>C52N</th><th>B70</th><th>C72/ C-62</th><th>HLZs</th><th>WHC</th><th>Tyndall MOA</th><th>A77</th><th>B82</th><th>A78</th></tr>
<tr><td rowspan="2">IS</td><td>Day</td><td>233</td><td colspan="3" rowspan="2">v</td><td rowspan="2">⊗</td><td colspan="4" rowspan="2">v</td><td colspan="6" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>116</td></tr>
<tr><td rowspan="2">ILRS</td><td>Day</td><td>58</td><td colspan="8" rowspan="2">v</td><td colspan="6" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>30</td></tr>
<tr><td rowspan="2">CAS</td><td>Day</td><td>133</td><td colspan="3" rowspan="2">v</td><td rowspan="2">⊗</td><td colspan="4" rowspan="2">v</td><td colspan="6" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>67</td></tr>
<tr><td rowspan="2">CSAR</td><td>Day</td><td>34</td><td colspan="3" rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td colspan="4" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>34</td></tr>
<tr><td rowspan="2">Haystack</td><td>Day</td><td>33</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="6" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>17</td></tr>
<tr><td rowspan="2">ULB</td><td>Day</td><td>66</td><td colspan="3" rowspan="2">v</td><td rowspan="2">⊗</td><td colspan="4" rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td colspan="3" rowspan="2">v</td></tr>
<tr><td>Night</td><td>34</td></tr>
<tr><td rowspan="2">TERF</td><td>Day</td><td>8</td><td colspan="3" rowspan="2">v</td><td colspan="5" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td rowspan="2">⊗</td><td colspan="3" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>16</td></tr>
<tr><td rowspan="2">HS/HSL</td><td>Day</td><td>6</td><td colspan="3" rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td colspan="3" rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>6</td></tr>
</table>

v = Used ⊗ = Not Used
WHC = Wynnhaven Corridor

Table 2-4. Maximum Number of Expendables per COMPTUEX and Locations (9-day event)

<table>
<tr><th rowspan="3">Ordnance</th><th rowspan="3">Time Period</th><th colspan="2" rowspan="2">Max # Expended</th><th colspan="18">Location of Expenditure</th></tr>
<tr><th colspan="2">B12</th><th colspan="2">C52N</th><th colspan="2">B70</th><th colspan="2">C72</th><th colspan="2">HLZs</th><th colspan="2">WHC</th><th colspan="2">A77</th><th colspan="2">C62</th><th colspan="2">B82</th></tr>
<tr><th>E</th><th>NE</th><th>E</th><th>NE</th><th>E</th><th>NE</th><th>E</th><th>NE</th><th>E</th><th>NE</th><th>E</th><th>NE</th><th>E</th><th>NE</th><th>E</th><th>NE</th><th>E</th><th>NE</th><th>E</th><th>NE</th></tr>
<tr><td rowspan="2">GBU-31/Mk84*</td><td>Day</td><td colspan="2">15</td><td rowspan="2">⊗</td><td colspan="3" rowspan="2">v</td><td rowspan="2">⊗</td><td colspan="3" rowspan="2">v</td><td colspan="10" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td colspan="2">10</td></tr>
<tr><td rowspan="2">GBU-32/16/Mk-83*</td><td>Day</td><td colspan="2">40</td><td rowspan="2">⊗</td><td colspan="3" rowspan="2">v</td><td rowspan="2">⊗</td><td colspan="3" rowspan="2">v</td><td colspan="4" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="5" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td colspan="2">20</td></tr>
<tr><td rowspan="2">GBU-12/Mk-82</td><td>Day</td><td>133</td><td>171</td><td rowspan="2">⊗</td><td colspan="3" rowspan="2">v</td><td rowspan="2">⊗</td><td colspan="3" rowspan="2">v</td><td colspan="4" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="5" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>67</td><td>85</td></tr>
<tr><td rowspan="2">CBU-99/Mk-20</td><td>Day</td><td>14</td><td rowspan="2">⊗</td><td colspan="16" rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>6</td></tr>
<tr><td rowspan="2">LGTR</td><td>Day</td><td rowspan="6">⊗</td><td>85</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="10" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>43</td></tr>
<tr><td rowspan="2">HIBs</td><td>Day</td><td>213</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="7" rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>107</td></tr>
<tr><td rowspan="2">Mk-76</td><td>Day</td><td>667</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="5" rowspan="2">⊗</td><td rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>333</td></tr>
<tr><td rowspan="2">Hellfire</td><td>Day</td><td>2</td><td rowspan="2">⊗</td><td colspan="6" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="11" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>2</td></tr>
<tr><td rowspan="2">Maverick</td><td>Day</td><td colspan="2">4</td><td rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td colspan="11" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td colspan="2">4</td></tr>
<tr><td rowspan="2">AGM-65E/F</td><td>Day</td><td>4</td><td rowspan="6">⊗</td><td colspan="2" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="11" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>4</td></tr>
<tr><td rowspan="2">2.75” Rocket</td><td>Day</td><td>128</td><td colspan="2" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="5" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="5" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>64</td></tr>
<tr><td rowspan="2">TOW</td><td>Day</td><td>85</td><td colspan="2" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="5" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="5" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td>43</td></tr>
<tr><td rowspan="2">7.62 mm</td><td>Day</td><td colspan="2">33,333</td><td colspan="4" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="4" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td colspan="2">16,667</td></tr>
<tr><td rowspan="2">.50 Cal</td><td>Day</td><td colspan="2">33,333</td><td colspan="4" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td colspan="2">16,667</td></tr>
<tr><td rowspan="2">20 mm</td><td>Day</td><td colspan="2">16,667</td><td colspan="4" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td colspan="2">8,333</td></tr>
<tr><td rowspan="2">5.56 mm</td><td>Day</td><td colspan="2">2,000</td><td colspan="4" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td colspan="3" rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td><td colspan="2" rowspan="2">v</td><td rowspan="2">⊗</td><td rowspan="2">v</td><td colspan="2" rowspan="2">⊗</td></tr>
<tr><td>Night</td><td colspan="2">1,000</td></tr>
</table>

v = Maximum possible expenditure ⊗ = Not expended
E = Explosive **NE** = Nonexplosive **WHC** = Wynnhaven Corridor
* Includes JDAM

2.2 ALTERNATIVE 1

Alternative 1 is similar in all respects to the Proposed Action, with the exception of the duration of the COMPTUEX/JTFEX training exercise. Under Alternative 1, the COMPTUEX/JTFEX training exercise would occur over a 5-day period as opposed to nine days as described under the Proposed Action. Activities would maintain the same day-to-day intensity of training events described under the Proposed Action; however, the total number of training events would be minimized by roughly half due to the shortened duration of the exercise.

As an example, under the Proposed Action there would be 25 Integrated Strike events over nine days, eight at night, 17 during the day. Assuming the events are evenly distributed over nine days, this equates to about one event per night and two events per day. Therefore, Alternative 1, following the same day-to-day intensity of the Proposed Action, would involve an approximate total of four nighttime events and eight daytime events, for a total of 12 Integrated Strike events over a 5-day period. Using these assumptions, the following Table 25 provides an alternative comparison.

Table 2-5. Comparison of Alternative 1 Events to Proposed Action

Mission	Time Period	Approximate Number of Events	
		Proposed Action (9-day Exercise)	Alternative 1 (5-day Exercise)
IS	Day	17	8
	Night	8	4
ILRS	Day	7	
	Night		
CAS	Day	16	9
	Night		
CSAR	Day	3	
	Night	2	
Haystack	Day	25	21
	Night		
ULB	Day	25-50	21-42
	Night		
TERF	Day	4	
	Night	8	7
HS/HSL	Day	12	6
	Night		

Alternative 1 is, therefore, similar to the Proposed Action in that all the same activities would occur under the same intensity, but the total number of events would be less because the duration of the COMPTUEX/JTFEX would be shorter.

2.3 NO-ACTION ALTERNATIVE

Under this alternative, other activities involving testing and training would continue to be conducted at Eglin AFB. Under baseline conditions, the Navy currently utilizes Eglin for training activities. Under the No-Action Alternative, the Navy would continue with ongoing baseline training activities while operating under existing NEPA documentation associated with those activities. This alternative would not meet the purpose and need of the Proposed Action in that the Navy would be unable to conduct a full-scale COMPTUEX/JTFEX training scenario at Eglin.

2.4 COMPARISON OF ALTERNATIVES

The Proposed Action and Alternative 1 are similar in the types of activities that would potentially occur under each. While the minimization of the COMPTUEX to a 5-day activity from a 9-day activity under Alternative 1 logically suggests the potential for a given type of impact would be reduced, the daily intensity of activities would be the same. For example, the maximum daily number of sorties flown and ordnance dropped could occur with either the Proposed Action or Alternative 1. As such, the types of environmental effects associated with the various Navy Pre-Deployment training events would not change, but the likelihood of occurrence would diminish (Table 2-6).

Table 2-6. Comparison of Issues of the Proposed Action and Alternative 1

Issue	Proposed Action	Alternative 1	No-Action
Socioeconomic Resources	There are no significant impacts to socioeconomic resources. The action would take place on Eglin test areas and airspace.	There are no significant impacts to socioeconomic resources. This alternative would take place on Eglin test areas and airspace.	No significant impact and no change to baseline operations.
Noise	Noise impacts would not be significant. Explosive ordnance detonations would potentially produce annoying levels of noise but no annual average thresholds would be exceeded, and harmful noise would not leave the reservation.	Noise impacts under this alternative would potentially be lessened due to fewer days of operation. However the daily noise intensity would be the same as the Proposed Action. No significant noise impacts would occur	No significant impact and no change to baseline operations.
Safety	Safety impacts would not be significant. Safety footprints for munitions would be provided by the safety office to ensure the safety of military personnel and the public. UXO would be addressed per existing Eglin procedures.	Safety impacts would not be significant. Safety footprints for munitions would be provided by the safety office to ensure the safety of military personnel and the public. The incidence of UXO would potentially be lower for this alternative given the fewer number of mission days.	No significant impact and no change to baseline operations.
Wetlands	Wetlands would not be significantly affected. Targets are generally located away from these areas. Vehicles would remain on established roads.	Wetlands would not be significantly affected. Targets are generally located away from these areas. . Vehicles would remain on established roads.	No significant impact and no change to baseline operations.

Table 2-6. Comparison of Issues of the Proposed Action and Alternative 1 Cont'd

Issue	Proposed Action	Alternative 1	No-Action
Floodplains and Coastal Zone	Floodplains and coastal zone would not be affected. The action would not occur in these areas.	Floodplains and coastal zone would not be affected. The action would not occur in these areas.	No significant impact and no change to baseline operations.
Water Quality	Water quality would not be significantly affected. Targets would generally be located away from surface waters.	Water quality would not be significantly affected. Targets would generally be located away from surface waters.	No significant impact and no change to baseline operations.
Air Quality	Air quality would not be significantly affected. Amounts of emissions from ordnance and aircraft would be minor compared to existing Eglin operations and county emission levels.	Air quality would not be significantly affected. Amounts of emissions from ordnance and aircraft would be minor compared to existing Eglin operations and county emission levels.	No significant impact and no change to baseline operations.
Hazardous Materials and Solid Waste	Hazardous materials and solid waste would not present a significant health or environmental impact. Procedures are in place for the handling, disposal and clean-up of these materials that minimize their risk.	Hazardous materials and solid waste would not present a significant health or environmental impact. Procedures are in place for the handling, disposal and clean-up of these materials that minimize their risk.	No significant impact and no change to baseline operations.
Sensitive Species	Sensitive species would not be significantly impacted. Some risk of noise and direct physical impacts (from bombs and fragments) exist but species populations would not be significantly affected.	Sensitive species would not be significantly impacted. Noise and direct physical impact risks would be slightly lower due to the decreased number of days reducing the opportunity for exposure.	No significant impact and no change to baseline operations.
Sensitive Habitats	Sensitive habitats would not be significantly affected. There is some risk of wildfire from explosive ordnance operations, but existing procedures for managing these risks would be observed.	Sensitive habitats would not be significantly affected. There is a slightly lower risk of wildfire (compared to the Proposed Action) from explosive ordnance operations, but existing procedures for managing these risks would be observed.	No significant impact and no change to baseline operations.
Cultural Resources	Cultural resources would not be significantly affected. The Eglin Cultural Resources Division has identified areas that should be avoided.	Cultural resources would not be significantly affected. The Eglin Cultural Resources Division has identified areas that should be avoided.	No significant impact and no change to baseline operations.
Environmental Justice and the Protection of Children	Environmental Justice analysis indicated that low income and minority communities would not be disproportionately affected. Some communities would experience some noise from explosive bombing but these effects would not be significant.	Environmental Justice analysis indicated that low income and minority communities would not be disproportionately affected. Some communities would experience some noise from explosive bombing but these effects would not be significant.	No significant impact and no change to baseline operations.

3. AFFECTED ENVIRONMENT

3.1 SOCIOECONOMICS

The communities surrounding the Eglin Reservation are both directly and indirectly affected by economic impacts through the daily operation of Eglin AFB. The counties of Okaloosa, Santa Rosa, and Walton are measurably affected economically by Eglin's operations. The impact of the Proposed Action's added socioeconomic effects can be measured through changes (in terms of magnitude and geographic extent) in key socioeconomic indicators. The principal socioeconomic indicators that may be affected either directly or indirectly by the Proposed Action are as follows.

- **Restricted Access.** Discussed as the availability of water and land areas to the public for commercial or recreational use and the temporary closure of these areas.
- **Environmental Justice.** Discussed as the demographics of each county's inhabitants in terms of percent minority and income.

The socioeconomics of the Eglin Military Complex are interdependent with the economies of Okaloosa, Santa Rosa, and Walton counties. Nearly 25 percent of Okaloosa County's employment depends on Eglin AFB and Hurlburt Field combined. Overall, 10 percent of the employment for the three-county area is attributable to Eglin AFB and Hurlburt Field. Population, tourism, and the economy would not be affected by the Proposed Action; therefore they are not discussed here.

3.1.1 Restricted Access

The Proposed Action at Eglin includes restrictions in terms of public access to military property. Access would be restricted by temporarily limiting the availability of water or land areas (e.g., roads) to the public at times when the COMPTUEX/JTFEX training is in progress. The purpose of restricting access to the public (and other military users) during these times is to ensure their safety while maintaining the integrity of the training.

3.1.1.1 Recreation

Land Recreation

Under the Sikes Act, Conservation Programs on Military Reservations (16 USC 670a to 670o; 1997-Supp, Sikes Improvement Act of 1997), DoD, in a cooperative plan with the Departments of the Interior (DOI) and State, opens Air Force bases to outdoor recreation and conserves and rehabilitates wildlife, fish, and game on each reservation. The Air Force is to manage the natural resources of its reservations to provide for biodiversity maintenance, sustained multipurpose use, and public use.

There are various public recreational activities that take place in the interstitial area of Eglin AFB. Approximately 280,000 acres of land are open for outdoor recreation. Outdoor activities include hunting, fishing, hiking, and camping, the most popular being hunting and fishing. Approximately 16,000 recreational permits are issued per year, with roughly 4,000 hunting

permits issued. The Eglin Reservation is closed to all public use and access from two hours after sunset until two hours before sunrise except for authorized activities as set forth in the Outdoor Recreation, Hunting, and Freshwater Fishing Map and Regulations. Figure 3-1 shows recreational areas on Eglin AFB. Test areas and areas designated as "closed" are not open to recreation.

There are 17 management units, each having its own regulations associated with seasons, hunting rules and regulations, mission activities, and access to the public and DoD-affiliated persons. All persons that engage in outdoor recreational activities are required to adhere to applicable Eglin AFB, federal, and state laws, rules, and regulations (Florida Game and Fresh Water Fish Commission, 1997). General regulations are in place that address prohibited actions (e.g., disturbing or removing any government property from the Eglin Reservation). Entry into both "closed" areas and "seasonally closed" areas is prohibited unless special permission has been granted by the Eglin AFB Commander. Areas designated as "open," such as the east end of Okaloosa Island, are available for all types of outdoor recreation with the exception of hunting. All rules and regulations for recreational activities can be obtained from Natural Resources Management (AAC/EMSN) at Eglin AFB (U.S. Air Force, 2003a).

Recreational, hunting, and fishing permits are required for anyone 16 years or older entering Eglin AFB and may be obtained from Natural Resources Management. Table 3-1 shows the dates of the Eglin Air Force Base 2002-2003 Hunting Seasons.

Table 3-1. Eglin AFB 2002-2003 Hunting Seasons

Hunting Activity	Dates of Season
Archery	19 October–17 November
Early Muzzle-loading Gun	22–24 November
General Gun	28 November–1 December, 14 December–5 January, 25 January–9 February
Late Primitive Weapon	14–17 February, 21–23 February
Early Small Game*	9 November–20 February
Late Small Game	6–24 January
Spring Turkey	15 March–20 April
Varmint/Predator**	15 May–31 August
Trapping	14 December–1 March
Mobility Impaired Hunt	1–2 February
Youth Hunt	8–9 February
Special Opportunity Turkey Hunt	5–6 April, 12–13 April

* Only within Management Unit 6 and the area north of Range Road 211, west of State Road 85 and east of State Road 87
** Management Units 10 and 12 only

While these dates are only valid for the 2002–2003 hunting seasons, they are indicative of the approximate dates that seasons fall on annually. Those persons hunting, fishing, or in possession of equipment used for these activities must have applicable state and federal licenses, stamps, and permits, as well.

Public access to the ranges has increased over the years according to Jackson Guard Natural Resource Branch information. Recreational permits (hunting, fishing, camping, etc.) have increased from 11,943 in FY96 to 13,158 in FY00. This is a public access increase to the Eglin Military Complex of 10 percent.

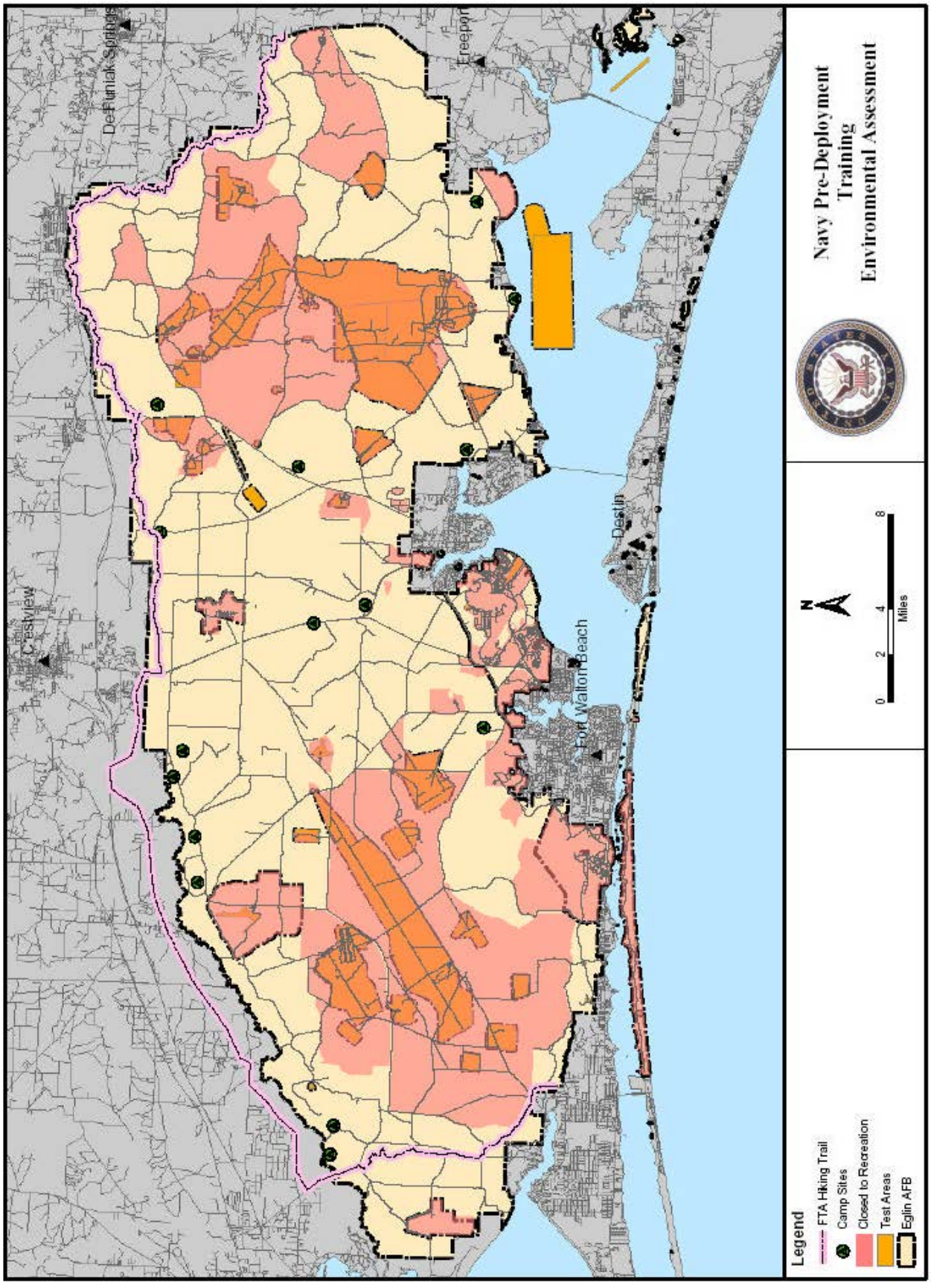

Figure 3-1. Recreational Areas on Eglin AFB

The Wildlife Section of the Eglin Natural Resources Branch is responsible for managing outdoor recreation activities; threatened, endangered, and nongame species; and fish and game. Outdoor recreation management activities include hunting, fishing, camping, and hiking. Camping on base is authorized only at designated campsites, with over 15 camping areas are located throughout the base. Closures and restricted access to certain recreational lands due to COMPTUEX/JTFEX training activities are analyzed for potential impact to the public. The continued DoD utilization of the Eglin Military Complex requires flexible and unencumbered access to land ranges and airspace, which support all of Eglin's operations.

The public is presently restricted from accessing LZs, Auxiliary Fields, and Test Areas because of the sensitivity and potential danger of munitions testing and training operations.

3.2 NOISE

3.2.1 Definition of the Resource

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may be stationary or transient. There is wide diversity in responses to noise that varies not only according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source and the receptor.

The physical characteristics of noise or sound include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves that travel through a medium, like air, and are sensed by the eardrum. This may be likened to the ripples in water that would be produced when a stone is dropped into it. As the acoustic energy increases, the intensity or amplitude of the pressure waves increase, and the ear senses louder noise.

Sound intensity varies widely (from a soft whisper to a clap of thunder or an explosion) and is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is nothing more than a mathematical tool that simplifies dealing with very large and very small numbers. For example, the logarithm of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is -6 (minus 6). Obviously, as more zeros are added before or after the decimal point, converting these numbers to their logarithms greatly simplifies calculations that use these numbers.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches.

The duration of a noise event and the number of times noise events occur are also important considerations in assessing noise impacts.

Sound measurement is refined through the use of "weighting" techniques that either emphasize or suppress some frequencies to better reflect how they are actually heard by the human ear. When describing large amplitude impulsive sounds such as explosions, the actual total amount of acoustic energy created by the event is an important consideration. This energy is considered as a sound pressure level (SPL), and is measured in terms of decibels (dBP) using peak meter response. Sounds of this nature are also measured on a "C-weighted" scale with slow meter response. C-weighting gives nearly equal emphasis to most frequencies, suppressing only the very low and very high frequency bands. Values of C-weighted noise are shown in terms of C-weighted decibels (dBC).

Conversely, nonimpulsive sounds of longer duration such as aircraft or traffic noise are further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000 to 4,000 Hz range. The human ear is most sensitive to frequencies in this range, and sounds measured with these instruments are termed "A-weighted," and are shown in terms of A-weighted decibels (dBA).

3.2.2 Existing Conditions

In the project region, ambient noise (the surrounding background noise) currently exists as a result of transportation-related and other human activities. Many types of civil and military aircraft operate throughout the region, and also make use of the military training airspace overlying the area. Vehicles on roads are also sources of noise. Military units currently conduct a wide range of training activities on and in the immediate vicinity of Eglin AFB. This includes ground-based operations and testing and training for military pilots in designated military training airspace.

Aircraft Noise

Noise from Eglin aircraft operations was modeled by airspace block using the program MOA Range NoiseMap (MR_NMAP) and expressed as L_{dn} (U.S. Air Force, 1996). Ambient noise, primarily from existing military aircraft operations, by airspace block is listed in Table 3-2.

Table 3-2. Ambient Aircraft Noise

Airspace Block	Noise Level (L_{dn})
R-2915B	55-60
R-2919B	40-50
R-2915C	45-55
R-2914A	40-48

3.3 SAFETY

The existing safety environment encompasses risk to public health, and with respect to the Proposed Action, risk to the health of military personnel, and those measures designed to minimize that risk. For actions occurring on military property with inherent safety risks, procedures are in place that minimize or eliminate altogether risks to the public. Such measures

include the designation of areas as "restricted" or "closed" to the public, either permanently or temporarily. Such closures are driven by the dimensions of the "safety footprint" of a particular action that may have potentially harmful noise, blast, or other effects, or by the existence of unexploded ordnance from historical missions.

Safety Footprints

Safety footprints and their restrictions on land usage vary based on several factors, including weapon type, flight profile, altitude, speed, or flight system of the specified test activity.

When applying the individual weapon safety footprints to the test areas on base, it is the policy of the Range Safety Office (AAC/SEU) to apply a one nautical mile wide safety buffer that generally parallels the base boundary. The external boundary of this safety buffer is the base boundary; the internal boundary is called the impact limit line. The impact limit line is the outermost boundary of allowable surface impact of items generated by the mission. In three areas (State Road 87, around Hurlburt Field, and around Eglin Main) this safety buffer becomes wider than the one nautical mile wide area described above. The safety buffer not only protects off-base areas from activities on base, but also buffers the base from adjacent off-base land uses, thereby ensuring off-base safety and compatible land use. The buffer also can attenuate the noise of test area activities, mitigating that impact on surrounding communities.

Unexploded Ordnance (UXO)

Eglin AFB has been testing munitions for over 60 years. During its long history, a vast number of different munition items have been expended throughout the Range as part of routine training and special testing activities. While UXO is an unintended but unavoidable consequence of any operation involving energetic material, only recently has the Air Force published standards for munitions residue maintenance, remediation, and documentation. The situation is exacerbated by the fact that Eglin AFB has adapted its range to the needs of the mission many times and so has changed the locations and shapes of its targets and impact areas. Therefore, it is not possible to conclude that all or even most of the contamination is on the active impact areas.

Eglin has conducted an archive search in order to document the locations of formerly used ranges but has yet to conduct any base-wide assessment of UXO contamination suitable to support an analysis of risk to training units. Previous informal analyses have centered around identifying areas with low enough risk to allow public recreation or to outgrant nonexcess real property. Currently, the Air Armament Center, Directorate of Safety (AAC/SE) office handles requests on a case-by-case basis and controls the risk by limiting the type, location, or frequency of the requested action based on an informal risk assessment using local historical knowledge, the U.S. Army Corps of Engineers Archive Search Report, and the Eglin Reservation Explosives Contamination study from July 1976.

Wildfires

Wildfires are usually detected by Eglin Natural Resources Branch personnel, Civil Air Patrol aircraft, military aircraft, Florida State Division of Forestry (DOF) fire towers, mission control personnel, or the public. There are four fire towers that Eglin uses only under severe fire hazard conditions: Jackson Guard, Okaloosa, Ramer, and Metts Towers. There are two other towers

utilized that are owned by the Florida DOF: the Crestview Tower (Okaloosa County) and the Coldwater Tower (Santa Rosa County).

Some causes of wildfire include mission activities, arson, carelessness of children and hunters/campers, lightning, and downed power lines. Most wildfires on Eglin occur around test areas (historically 75 percent) from mission activities such as explosions and air-to-ground gunnery. There are two primary dry seasons on Eglin when fire hazards increase (April through May and mid-September through November); however, the fire season is year-round (U.S. Air Force, 2002a). The high-intensity storms that frequent this area not only deliver significant amounts of rain, they also create frequent lightning strikes, which can easily start wildfires.

These lightning events and associated fires were historically instrumental in sustaining fire-dependent plant communities such as the Longleaf Pine-Wiregrass association. However, recent events have shown that wildfires can still have widespread, devastating effects on the landscape. Table 3-3 presents causes of wildfire data from 1990 through 2002 for Eglin.

Table 3-3. Eglin AFB Wildfires for 1990 through 2002

Cause	Metric	Year									
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Air Force Mission	*Number of Fires*	64	51	45	38	40	42	27	36	46	48
	Acres Burned	4322	4295	9554	9640	2614	11917	4500	2933	9599	10408
	Average Size (ac)	68	84	212	254	65	283	166	81	209	217
Army Mission	*Number of Fires*	19	11	11	10	20	18	20	18	14	12
	Acres Burned	726	314	2627	1245	755	6140	860	1975	637	216
	Average Size (ac)	38	29	239	125	38	341	43	110	45	18
Arson	*Number of Fires*	5	3	6	22	1	5	4	2	1	3
	Acres Burned	6	56	2696	2418	6	60	203	2.6	14	13
	Average Size (ac)	1	19	449	110	6	12	51	1.3	14	4
Children	*Number of Fires*	2	5	2	3	5	3	2	1	1	4
	Acres Burned	0	10	251	101	24	0.2	0.5	3	14	181
	Average Size (ac)	0	2	126	34	5	0.07	0.25	3	14	45
Hunters	*Number of Fires*	0	0	0	1	0	1	2	0	0	2
	Acres Burned	0	0	0	10	0	0.25	9	0	0	117
	Average Size (ac)	0	0	0	10	0	0.25	4.5	0	0	58
Lightning	*Number of Fires*	7	1	4	2	3	6	5	24	7	7
	Acres Burned	225	50	221	1	18	174	32	875	110	2348
	Average Size (ac)	32	50	55	0	6	29	6.4	36	16	335
Miscellaneous	*Number of Fires*	4	9	9	9	9	9	6	7	2	1
	Acres Burned	35	986	546	12	346	543	438	3029	372	378
	Average Size (ac)	9	110	61	1	38	60	73	433	186	378
Powerline	*Number of Fires*	4	1	1	2	0	2	0	2	4	1
	Acres Burned	14	0	2	1	0	1.2	0	25	58	18
	Average Size (ac)	4	0	2	1	0	0.6	0	13	14.5	18
Unknown	*Number of Fires*	11	5	9	10	5	11	3	19	8	30
	Acres Burned	241	3	1286	44	94	1580	200	911	180	919
	Average Size (ac)	22	1	143	4	19	143	67	48	22	31

ac = acre Source: U.S. Air Force, 2001

Once a fire is started, it can spread to adjacent forested buffer zones. The fires are either extinguished or allowed to burn under control if they may have any beneficial effects. Wildfires have decreased on Eglin since 1986. The numbers of wildfires have decreased because of fire management practices such as prescribed burns, which decrease fuel availability for wildfires. In Florida, 4,500 wildfires were reported on an average annual basis between 1990 and 2000 (Florida Forest Protection Bureau, 2001) with an average of about 109 of those occurring each year on or near the Eglin Reservation, burning an average of approximately 8,300 acres per year (U.S. Air Force, 2001).

Safety Regulations

The following list of standards and regulations would apply to safety for the COMPTUEX/ JTFEX training under the Proposed Action.

29 Code of Federal Regulations (CFR) 1910.120, 1996, Occupational Safety and Health Act, Chemical Hazard Communication Program (OSHA). Requires that chemical hazard identification, information, and training be available to employees using hazardous materials, and institutes material safety data sheets (MSDS) that provide this information.

Department of Defense Instruction 6055.1. Establishes occupational safety and health guidance for managing and controlling the reduction of radio frequency exposure.

AAC Instruction (AACI) 48-102. Nonionizing Radiation Control Program. Establishes the Nonionizing Radiation Control Program on Eglin with the intended purpose of minimizing hazards created by the use of nonionizing systems and equipment without unduly restricting their use, and to implement required regulatory controls.

Department of Defense Flight Information Publication. Identifies regions of potential hazard resulting from bird aggregations or obstructions and military airspace noise sensitive locations, and defines airspace avoidance measures.

Air Force Instruction 32-2001, 8-Oct-99, The Fire Protection Operations and Fire Prevention Program. Identifies requirements for Air Force structural fire protection programs (equipment, response time, and training).

Air Force Instruction 32-7063, 1-Mar-94, Air Installation Compatible Use Zone Program (AICUZ). The AICUZ Study defines and maps potential accident zones and runway clear zones around the installation and contains specific land use compatibility recommendations based on aircraft operational effects and existing land use, zoning, and planned land use.

Air Force Manual 91-201, 12-Jan-96, Explosives Safety Standards. Regulates and identifies procedures for explosives safety and handling as well as defining requirements for ordnance quantity distances, safety buffer zones, and storage facilities.

Air Force Instruction 91-301, 1-Jun-96. Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program. Identifies occupational safety, fire prevention, and health regulations governing Air Force activities and procedures associated with safety in the workplace.

Air Force Instruction 13-217, Assault Zone Procedures. Requires a survey for safety and environmental considerations of all potential helicopter landing zones before use.

Air Force Operational Plan 32-1, Wildfire Procedures and Restrictions. Identifies the procedures for reporting wildfires and the restrictions associated with preventing wildfire occurrence.

3.4 SOILS/EROSION

The Eglin Reservation is home to a diversity of soil types with unique physical and chemical characteristics that, in combination with a subtropical climate, partly determine the structure and function of ecosystems. The characteristics of geologic formation parent materials underlying the Eglin Reservation have a strong influence on soil formation and development.

3.4.1 Soil Series

There are approximately 63 soil series that comprise the soil environment of the Eglin Military Complex (to include Santa Rosa Island). Of these, 16 occupy total land areas of less than 50 acres, 43 occupy about 15 percent (74,409 acres), and 4 soils (Lakeland sand, Dorovan muck, Dorovan-Pamlico Association, and Troup sand) comprise 84 percent of Eglin soils. Information on these four soils, as well as the Newhan-Corolla Complex (which comprises most of Santa Rosa Island) is given in narratives below.

Lakeland Soil Series

The Lakeland series consists of very deep, very strongly acidic soils that formed in thick beds of eolian, fluvial, or marine sands on broad, nearly level to very steep uplands in the Lower Coastal Plain. Depth to seasonal water table is more than 80 inches. All horizons are sand or fine sand with 5 to 10 percent silt plus clay in the 10- to 40-inch control section. Slopes are dominantly 0 to 12 percent, but range to 85 percent in dissected areas.

Dorovan Series

The Dorovan series consists of very poorly drained, moderately permeable soils on densely forested flood plains, hardwood swamps, and depressions of the Coastal Plains. They formed in highly decomposed acid-organic materials. Slopes range from 0 to 2 percent but are normally less than 1 percent. The organic material ranges from 51 to more than 80 inches thick. It is extremely acid or very strongly acid in the organic layers. It is strongly acid or very strongly acid in the 2C horizon. The soil is saturated to the surface most of the time. Runoff is very slow and water is ponded on the surface in depressions. The underlying mineral sediments commonly are loamy or sandy and are very strongly acid or strongly acid.

Newhan Series

The Newhan series consists of excessively drained soils, rapidly permeable soils formed from sands deposited by wind. Runoff is slow. These soils are on gently undulating dunes commonly near beaches and waterways along the coast. Slopes are commonly 2 to 7 percent but range from 0 to 30 percent. The elevation of these soils commonly ranges up to about 75 feet or more above

mean sea level. The soil consists of sand and shell fragments deposited mainly by wind along the Atlantic Coast. However, some areas are a result of dredge spoil material. Slopes range from 0 to 30 percent. Thickness of the A and C horizons is more than 72 inches. Reaction is extremely acid to slightly alkaline. Calcareous shell fragments, mostly of sand size, make up to 35 percent of the soil by volume. The soil contains few to common grains of dark minerals. Silt plus clay in the 10- to 40-inch control section is less than 5 percent.

Pamlico Series

The Pamlico series consists of very poorly drained soils that formed in decomposed organic material underlain by dominantly sandy sediment. The soils are on nearly level flood plains, bays, tributaries of major streams, and depressions of the Coastal Plain. Runoff is very slow and flooding is rare to frequent. Permeability is moderate to moderately rapid in the organic layers and slow to very rapid in the mineral layers. Slopes are less than 1 percent. Pamlico soils have 16 to 51 inches of organic material over dominantly sandy sediments. Reaction is extremely acid (less than 4.5 in 0.01 M calcium chloride) in the organic layers, and ranges from extremely acid to strongly acid in the underlying mineral layers.

Troup Series

The Troup series consists of deep, somewhat excessively drained soils with thick sandy surface and subsurface layers and loamy subsoils. They formed in nearly level to steep unconsolidated sandy and loamy marine sediments on Coastal Plain uplands. Runoff is slow and permeability is moderate in the Bt horizon and rapid in the A and E horizons. Slopes are dominantly 0 to 15 percent but range to 40 percent. Solum thickness is more than 80 inches. Reaction of the surface and subsurface layers ranges from very strongly acid to medium acid, except where limed, and from very strongly acid to strongly acid in the subsoil. Base saturation of the control section is less than 30 percent and calcium content is less than 1 meq per 100 grams of soil. Thickness of the A and E horizons ranges from 40 to 79 inches. Percent by volume of quartz gravel and ironstone nodules ranges up to 10 percent in the solum.

3.4.2 Erosion

Soil erosion is a three-phase process of detachment, transport, and deposition of surface materials by water, wind, ice, or gravity initiated by drag, impact, or tractive forces acting on individual soil particles. It is a relentless process that is nearly impossible to stop, difficult to control, and easily accelerated by humans. Accelerated erosion caused by humans occurs at rates much greater than natural erosion conditions and has been shown to have detrimental effects on soils and ecosystems.

During rainfall events, water that reaches the surface is stored in depressions or infiltrates into the soil. When the soil is unable to take in more water, the excess moves downslope to areas of concentrated flow resulting in overland flow erosion. The result is on- and off-site consequences that can adversely affect the form and function of terrestrial and aquatic ecosystems. The immediate on-site net effect of erosion is loss of productivity that may alter the capability of the land to support plant and animal species and off-site problems may develop because of sediment deposition.

The susceptibility of the soil to erosion (erodibility) is primarily dependent on factors such as soil texture, moisture content, pH, and ionic strength of the eroding water. Soil erodibility generally decreases with increasing clay and organic matter content, whereas uniform silts and sands tend to have high soil erodibility (Gray and Leiser, 1982). Slope angle and length are the primary topographic variables influencing rainfall erosion. Slope length influence tends to increase with increasing slope angle. As an example, doubling slope length from 100 to 200 feet on a 6 percent slope would increase potential soil loss by 29 percent, whereas the same slope length doubling on a 20 percent slope would increase potential soil loss by 49 percent. Vegetation plays a pivotal role in the interception and diffusion of water energy from rainsplash and overland water flows (Wischmeir and Smith, 1958).

Soil erosion is an important social and economic problem and an essential factor in assessing ecosystem health and function. It is associated with two major types of environmental damage: reduced land productivity and water pollution. Soil erosion results in the loss of biodiversity and habitats, degradation of water quality, sedimentation, and eutrophication of water bodies. Human-induced soil disturbances whether minor, transitory, or drastic generally determine the nature of environmental effects. The loss of soil constituents can significantly reduce the capacity of the soil to support life, and the generation of sediment can be particularly devastating to water quality and aquatic ecosystems.

Some disturbances may be minor or transitory, allowing the landscape to reclaim productivity, while other disturbances may be characterized as ecosystem-altering events. Drastically disturbed sites that exhibit the removal of plant and animal communities; removal of litter layers; and loss, alteration, or burying of surface soils will not heal themselves within the lifetime of man through natural successional processes (American Society of Agronomy, 1978). Examples of man-induced disturbances include urbanization, road building, clay pit mining, test area maintenance and support operations, and military testing and training missions.

Eroded soil particles moved and deposited by a watercourse are known as sediment, which can adversely alter water quality, habitats, and the hydrologic form and function of waterways and wetlands. Suspended sediment in waterways inhibits light penetration and photosynthesis and diminishes the aesthetic value of water bodies. Sediment deposition in waterways leads to premature filling of water bodies, exertion of large oxygen demands on the water, burial of benthic organism aquatic habitats, and alteration of stream hydrology. Introduction of sediments and the other pollutants into ecosystems at accelerated rates resulting from human activities can adversely impact terrestrial and aquatic environments, damage or destroy cultural resources, reduce recreation use and value of affected watersheds, and increase land management and operating costs.

Sediment deposition on other terrestrial systems can bury and kill vegetation and other organisms. Environmental damage potentials may be further compounded by the introduction of materials such as organic matter and soil-bound nutrients, pesticides, metals, or other compounds to receiving ecosystems. Excess sedimentation can directly and indirectly impact threatened and endangered wildlife and vegetation by altering habitats to a point that may exclude their use by species of concern.

3.5 WETLANDS

3.5.1 Regulatory Overview

Wetlands are defined in the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (USACE, 1987). All jurisdictional wetlands in the United States meet three wetland delineation criteria (hydrophytic vegetation, hydric soils, and wetland hydrology) and are protected under Section 404 of the Clean Water Act (33 United States Code Section 1344) and its implementing regulations found in 40 Code of Federal Regulations 230. Wetlands on federal lands are further protected under Executive Order (EO) 11990, which states "...each federal agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands...."

FDEP's wetland program regulates dredge and fill activities in both fresh and salt waters under it's jurisdiction. Waters adjoining Florida's coastline are also under the state's jurisdiction. Permit applications made to the FDEP can also serve as joint applications to initiate concurrent review by the USACE.

When considering a ground-disturbing project or action occurring in a wetland, numerous steps are required. First, the presence or absence of a wetland within the project site determines the potential for impacts and the need for necessary permits. Once potential impacts have been identified, this action cannot be taken if a practicable alternative exists. If, however, no practicable alternative exists to the Proposed Action, mitigation must be taken to minimize impacts in or adjacent to wetlands, and should be implemented early in the site planning process to reduce or eliminate direct and indirect impacts. The USACE and FDEP both have a formal process for determining a jurisdictional wetland. This delineation process would be accomplished in coordination with AAC/EMCE, AAC/EMSN, 16 SOW/CEV, and the Proponent or his contractor.

Before an action that adversely impacts wetlands may proceed, EO 11990 requires the head of the agency to find that there is no practicable alternative to conducting the action in wetlands. Mitigation measures may be necessary to minimize impacts. Additionally, an environmental assessment or a finding of no practicable alternatives report must be prepared and public notice of intent must be made before proceeding with USACE consultation.

3.5.2 Ecological Description

Wetland areas are sensitive habitats that are inundated (water-covered), or where water is present either at or near the surface of the soil for distinguishable periods of time throughout the year. Local hydrology and soil saturation largely affects soil formation and development as well as the plant and animal communities found in wetland areas. Hydric (wet), anaerobic (lacking oxygen) sediments resulting from the presence of water typify wetlands. Figure 3-4 in Section 3.11, Sensitive Habitats, shows wetland areas on Eglin Air Force Base as identified in the National Wetlands Inventory (NWI).

Wetlands support both aquatic and terrestrial organisms. Large varieties of microbes, vegetation, insects, amphibians, reptiles, birds, fish, and mammals can be found living in concert in wetland ecosystems. Through a combination of high nutrient levels, fluctuations in water depth, and primary productivity of plant life, wetlands provide the base of a complex food-web, supporting the feeding and foraging habits of these animals for part or all of their life cycle. During migration and breeding, many nonresident and transient bird and mammal species also rely on wetlands for food, water, and shelter.

3.6 FLOODPLAINS AND COASTAL ZONE

3.6.1 Regulatory Overview

Any actions being considered by federal agencies must be evaluated to determine whether they would occur within a floodplain (Executive Order 11988, Floodplain Management). Floodplains that must be considered include those areas with a 1 percent chance of being inundated by floodwater in a given year (also known as a 100-year floodplain).

The term "coastal zone" is defined as coastal waters and adjacent shorelands strongly influenced by each other and in proximity to the several coastal states, and including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. "Coastal waters" are defined as any waters adjacent to the shoreline that contain a measurable amount of sea water, including but not limited to sounds, bays, lagoons, bayous, ponds, and estuaries. The outer boundary of the coastal zone is the limit of state waters, which for the Gulf coast of Florida is 9 nautical miles from shore. The Proposed Action is to be conducted within Eglin airspace, land ranges, and water resources. As such, some components of this action would take place within the jurisdictional concerns of the Florida Department of Environmental Protection and therefore would require a consistency determination with respect to Florida's Coastal Zone Management Plan and the Coastal Zone Management Act. FDEP also regulates activities in jurisdictional waters/wetlands through the Dredge and Fill Permitting Program.

Executive Order (EO) 11988, Floodplain Management (1977, 42 Fed. Reg. 26951), requires federal agencies to avoid adverse impacts associated with the occupancy and modification of floodplains and to avoid floodplain development whenever possible. Additionally, EO 11988 requires federal agencies to make every effort to reduce the risk of flood loss, minimize the impact of floods on human health, safety, and welfare, and preserve the natural beneficial value of floodplains. The order stipulates that federal agencies proposing actions in floodplains consider alternative actions to avoid adverse effects, avoid incompatible development in the floodplains, and provide opportunity for early public review of any plans or proposals. If adverse effects are unavoidable, the Proponent must include mitigation measures in the action to minimize impacts.

Additionally, EO 11990, Protection of Wetlands (1977, 42 Fed. Reg. 26961), places additional requirements on floodplains when considered as wetlands in the EO. It requires federal agencies to avoid undertaking or providing assistance for new construction located in wetlands unless there are no practicable alternatives and all practicable measures to minimize harm to wetlands have been implemented. It also precludes federal entities from leasing space in wetland areas unless there are no practicable alternatives.

Parts of the floodplain that are also considered wetlands would, in addition to floodplain zonings, receive protection from federal, state, and local wetland laws. These laws, such as the U.S. Army Corps of Engineers Section 404 Permit Program, regulate alterations to wetlands to preserve both the amount and integrity of the nation's remaining wetland resources.

The Coastal Zone Management Act (CZMA) provides for the effective, beneficial use, protection, and development of the United States coastal zone. Federal agency activities in the coastal zone are required to be consistent to the maximum extent practicable with approved state Coastal Zone Management Plans. Federal agencies make determinations whether their actions are consistent with approved state plans and submit these determinations for state review and concurrence. All relevant state agencies must review the Proposed Action and issue a consistency determination. The Florida Coastal Management Program (FCMP) is composed of 23 Florida statutes administered by 11 state agencies and four of the five water management districts.

3.6.2 Floodplain Description

Floodplains are lowland areas adjacent to surface water bodies (i.e., lakes, wetlands, and rivers) that are periodically covered by water during flooding events. Floodplains carry and store floodwaters during flood events. Floodplains and riparian habitat are biologically unique and highly diverse ecosystems that contain a rich diversity of aquatic and terrestrial species, acting as a functional part of natural systems. Floodplain vegetation and soils act as water filters, intercepting surface water runoff before it reaches lakes, streams, or rivers. This process aids in the removal of excess nutrients, pollutants, and sediments from the water and helps reduce the need for costly cleanups and sediment removal. Floodplains also reduce downstream flooding by increasing upstream storage in wetlands, sloughs, back channels, side channels, and former channels.

Flooding on Eglin AFB could occur as a result of rainfall within the base's drainage basins, hurricanes, or a combination of both. The majority of the installation is above the Federal Emergency Management Agency (FEMA) 100-year flood zone. Most of the perennial streams on base are included within areas expected to be inundated by 100-year floods. The 100-year floodplain is considered a Wetland Resource Area under the Wetlands Protection Act.

3.7 WATER RESOURCES AND WATER QUALITY

3.7.1 Regulatory Overview

Water resources are protected by a number of federal and state water quality acts, a floodplain management directive, and implementing regulations. Major applicable laws, regulations, orders, and instructions include the following.

- Safe Drinking Water Act
- Florida Safe Drinking Water Act
- Clean Water Act
- Florida Surface Water Improvement and Management Act (SWIM) of 1987
- Florida Water Quality Assurance Act (1983)

- Florida Administrative Code (FAC) Sections 62-301, Surface Waters of the State and 62-302, Surface Water Quality Standards
- FAC Section 62-550, Drinking Water Standards, Monitoring and Reporting
- Executive Order 11988, Floodplain Management (implemented for the Air Force as part of Air Force Instruction 32-7060)
- Executive Order 11990, Protection of Wetlands
- Air Force Instruction (AFI) 32-7041, Water Quality Compliance.
- Total Maximum Daily Loads Program (TMDLP) and the Florida Watershed Restoration Act (FWRA)
- FAC 62-303, Impaired Waters Rule
- FAC 62-312, Dredge and Fill Activities
- 40 Code of Federal Regulations (CFR) 122.26, Storm Water Discharges
- FAC 62-25 Regulation of Stormwater Discharge

The U.S. Environmental Protection Agency (USEPA) is responsible for implementing regulations for the Safe Drinking Water and Clean Water Acts. The Florida Department of Environmental Protection (FDEP) oversees implementation of state and some federal regulatory requirements including the Florida Safe Drinking Water Act and Florida Administrative Code (FAC) 62-550, Drinking Water Standards, Monitoring and Reporting. On Eglin Air Force Base, AFI 32-7041 instructs the Air Force on how to assess, attain, and sustain compliance with the Clean Water Act; other federal, state, and local environmental regulations; and related Department of Defense (DoD) and Air Force water quality directives. In general, these acts and regulations establish a variety of programs to monitor surface water and groundwater quality, identify waters with substandard water quality and the causes of the water quality problems, and implement measures to remediate these problems and minimize future degradation of water quality by human actions. Where applicable, these laws, regulations, orders, and instructions are discussed in the appropriate resource sections.

The Florida Administrative Code Sections 62-301 and 62-302, (Surface Waters of the State and Surface Water Quality Standards) identify certain state waters that have been designated Outstanding Florida Waters (OFWs). The regulatory significance of this designation is that the FDEP cannot allow ambient water quality to significantly decrease through the issuance of permits for direct or indirect pollutant discharge (FDEP, 2002).

Eglin AFB has an existing National Pollutant Discharge Elimination System (NPDES) permit for industrial discharge of stormwater, but construction activities greater than 1 acre in scope that may potentially create erosion would require an additional NPDES construction permit.

3.7.2 Surface Waters

Surface water is any water that lies above groundwater, such as ponds, rivers, streams, and springs or artificial containments. Surface water hydrology on Eglin AFB is directly linked to geology and geomorphology. Lakes, ponds, and wetlands occur where local shallow clay and silt layers restrict the downward movement of water to the regional water table (U.S. Air Force,

1995). The hydrologic characteristics of each drainage basin can be directly related to watershed geology and drainage density.

Eglin AFB encompasses portions of two hydrologic basins as defined by the U.S. Geological Survey (USGS) (FDEP, 2000): the Choctawhatchee River Basin and the Blackwater-Yellow River Basin. Surface water in these basins is extensive. Eglin AFB includes 32 lakes (over 300 acres of man-made ponds and natural lakes), 30 miles of rivers, an extensive stream network covering approximately 600 acres of the base, and 20 miles of Gulf of Mexico shoreline, and is adjacent to several estuarine bays along the Gulf of Mexico (U.S. Air Force, 2001).

Stream flow remains fairly constant all year in the small streams on mainland Eglin AFB because of a close relationship between groundwater and surface water (U.S. Air Force, 1995). Rainfall rapidly infiltrates the soil profile to recharge the shallow groundwater. The stored groundwater is released slowly to the surface water (Becker et al., 1989). There is an increase in drainage on the Eglin land range from the west to the east that results from higher elevations in the east. Also, there is an increased clay content and hardpan development in the soils and underlying sediments to the east. This produces lower permeability, more surface run-off, and attendant channel development.

Outstanding Florida Waters (OFWs)

Waters listed as OFWs include surface waters in national parks, aquatic preserves, wildlife refuges, marine sanctuaries, wild and scenic rivers, state aquatic preserves, and waters in areas acquired through donation, trade, or purchase. It is the FDEP's policy to afford the highest protection to Outstanding Florida Waters. No degradation of water quality, other than that allowed in Rule 62-4.2.4.2(1) and (2), is permitted in these waters. OFWs directly adjacent to Eglin AFB include Fred Gannon Rocky Bayou State Park and Aquatic Preserve and the Yellow River Marsh Aquatic Preserve.

Surface Water Quality

Water quality is a measurement of the chemical and physical characteristics of a water mass that describes its suitability for specific uses. The state of Florida has developed and retains primacy for surface water quality standards for all waters of the state (FAC 62-301 and FAC 62-302) in accordance with the provisions of the Clean Water Act. A scoring system based on the data in the *Florida Water Quality Assessment, 2000 305 (b) Report* (FDEP, 2000) is used by FDEP to rate the quality of surface waters of the state. Florida surface waters were rated for the following categories.

- Fully Meets Use
- Partially Meets Use
- Does Not Meet Use
- Insufficient Data

Based on the above system, the surface water quality of rivers, streams, creeks, bayous, and bays in the Region of Influence was rated by the state. The report delineated large basins and numerous sub-basins for each of the five water districts in the state. Water quality of many of

the basins on the Eglin Military Complex has apparently improved, achieving a rating upgraded from partially meeting FDEP water quality standards in 1996 to fully meeting water quality standards in 2000. However, water quality data for several sub-basins on the Eglin Military Complex was lacking such that an assessment could not be made for either year.

In general, all the major river/stream mainstems (Yellow River, Turkey Creek, Rocky Creek, Turtle Creek, and Live Oak Creek) were rated as fully meeting water quality standards. Improvements in water quality occurred in Choctawhatchee Bay and in the southern and western portions of the Eglin Military Complex. Several central and eastern sub-basins of the Eglin Military Complex were generally deficient in data necessary for a 305(b) water quality evaluation. Water quality criteria for Class I, II, and III waters are presented in Table 3-4.

3.7.3 Groundwater

The two aquifers located under Eglin are the Sand and Gravel Aquifer and the Floridan Aquifer. Eglin uses only a small amount of water from the Sand and Gravel Aquifer; however, the Floridan Aquifer is used extensively. The Floridan Aquifer is located below the Sand and Gravel Aquifer and extends beneath most of Florida.

Sand and Gravel Aquifer

The Sand and Gravel Aquifer consists of the Citronelle formation and marine terrace deposits that reach a maximum thickness of 1,200 feet at Mobile Bay, Alabama (U.S. Air Force, 1995). Although the aquifer is composed of clean, fine-to-coarse sand and gravel, locally it contains some silt, silty clay, and peat beds. The Sand and Gravel Aquifer is segregated from the underlying limestone of the Floridan Aquifer by the Pensacola Clay confining bed. Water in the Sand and Gravel Aquifer exists in generally unconfined (free water surface or water table conditions) and confined (under pressure) conditions (Becker et al., 1989). It is vulnerable to contamination from surface pollutants (Becker et al., 1989; U.S. Air Force, 1995). Pollutants enter the Sand and Gravel Aquifer by percolating downward through the sandy soils. They then migrate laterally in the groundwater and enter surface waters through base flow that provides most of the water to area streams and creeks. Wildlife habitat and vegetation provided by the streams are affected by the pollutants in the surface water (U.S. Air Force, 1995).

Where the aquifer is in direct contact with surface water, such as a stream or Choctawhatchee Bay, water table conditions occur (Becker et al., 1989). The water table is at or within a few feet of land surface in the Coastal Lowlands region. The water table occurs at considerable depth below the land surface in the Western Highlands (U.S. Air Force, 1995). Lakes and ponds occur where local shallow clay and silt layers restrict the downward movement of water to the regional water table (U.S. Air Force, 1995).

The quality of water in the aquifer has been rated good (i.e., meets its intended use) by the Florida Department of Environmental Protection (U.S. Air Force, 1995). Water from this aquifer is not a primary source of domestic or public supply water on Eglin because of the large quantities of higher quality water available from the underlying Upper Limestone of the Floridan Aquifer (Becker et al., 1989; U.S. Air Force, 1995).

Table 3-4. Water Quality Criteria for Class I, II, and III Waters

Parameter	Units	Class I	Class II	Class III	
				Fresh	Marine
Turbidity	NTU	=29 above background	=29 above background	=29 above background	=29 above background
Dissolved Solids	mg/L	=500 monthly average, =1,000 maximum	None	None	None
PH	pH units	No change more than one unit above or below background	No more than one unit change for coastal waters or 0.2 unit change for open waters	No more than one unit change above or below background	No more than one unit change for coastal waters or 0.2 unit change for open waters
Chlorides	mg/L	=250	No increase >10 percent above background	None	No increase >10 percent above background
Fluorides	mg/L	=1.5	=1.5	=10.0	=5.0
Conductivity	Micromh o	No increase above 50 percent of background or 1,275	None	No increase above 50 percent of background or 1,275	None
Dissolved Oxygen	mg/L	Not less than 5.0	Not average less than 5.0 and never be less than 4.0	Not less than 5.0	Not average less than 5.0 and never be less than 4.0
BOD	mg/L	No increase such that DO drops below limit for any class.			
Nutrients: Total Phosphorus, Total Nitrogen		No alteration in nutrients such that an imbalance in natural populations of aquatic flora or fauna results.			
Total Coliform	#/100 ml	=2,400 in any one sample	No more than 10 percent of samples exceed 230	=2,400 in any one sample	=2,400 in any one sample
Fecal Coliform	#/100 ml	=800 in any one sample	=800 in any one sample	=800 in any one sample	=800 in any one sample
Copper	µg/L	=(.8545[in hardness] – 1.465)	=2.9	=(.8545[in hardness] – 1.465)	=2.9
Iron	mg/L	=0.3	=0.3	=1.0	=0.3
Lead	µg/L	(1.273[in hardness] – 4.705)	=5.6	(1.273[in hardness] – 4.705)	=5.6
Zinc	µg/L	(0.8473[in hardness] + 0.7614)	=86	(0.8473[in hardness] + 0.7614)	=86
Mercury	µg/L	=0.012	=0.025	=0.012	=0.025

Source: FDEP, 2000

Floridan Aquifer

The Floridan Aquifer, Eglin's sole drinking water source, consists of a thick sequence of interbedded limestone and dolomites. Throughout the Eglin Reservation, the Floridan Aquifer exists under confined conditions, bounded above and below by the Pensacola Clay confining bed. This clay layer restricts the downward migration of pollutants and restricts saline water from Choctawhatchee Bay and the Gulf of Mexico from entering the Upper Limestone layer of the aquifer. The clay layer of the Bucatunna Formation separates the Upper and Lower Limestone units. Because it is saline, the Lower Limestone unit is not used as a water source (U.S. Air Force, 1995). Groundwater storage and movement in the Upper Limestone layer occurs in interconnected, intergranular pore spaces, small solution fissures, and larger solution channels and cavities. Water quality for raw water drawn from the Upper Limestone layer of the Floridan Aquifer is of suitable quality for most uses.

Groundwater Contamination

Contamination of the Sand and Gravel Aquifer has occurred through past base-related activities. Several base Installation Restoration Program (IRP) sites report various amounts of pesticides, heavy metals, petroleum hydrocarbons, and other compounds throughout the Eglin land test areas (U.S. Air Force, 1995). Additional information on IRP sites is available in Section 3.9, Hazardous Materials/Solid Waste.

3.8 AIR QUALITY

Air quality in a given location is described by the concentration of various pollutants in the atmosphere, generally expressed in units such as parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

Pollutant concentrations are compared to federal and state ambient air quality standards to determine potential effects. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare, with a reasonable margin of safety. The National Ambient Air Quality Standards (NAAQS) are established by the Environmental Protection Agency (USEPA). In order to protect public health and welfare, the USEPA has developed numerical concentration-based standards or NAAQS for six "criteria" pollutants (based on health-related criteria) under the provisions of the Clean Air Act (CAA) Amendments of 1970. There are two kinds of NAAQS: primary and secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

National Ambient Air Quality Standards have been established for: ozone (O_3); nitrogen dioxide (NO_2); carbon monoxide (CO); sulfur oxides (SO_x), measured as sulfur dioxide (SO_2); lead

(Pb); particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}); and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$). The NAAQS are the cornerstone of the CAA. Although not directly enforceable, they are the benchmark for the establishment of emission limitations by the states for the pollutants that USEPA determines may endanger public health or welfare. Florida has adopted the NAAQS except for sulfur dioxide (SO_2). USEPA has set the annual and 24-hour standards for SO_2 at 0.03 ppm (80 µg/m^3) and 0.14 ppm (365 µg/m^3), respectively. Florida has adopted the more stringent annual and 24-hour standards of 0.02 ppm (60 µg/m^3) and 0.01 ppm (260 µg/m^3), respectively. In addition, Florida has adopted the national secondary standard of 0.50 ppm (1,300 µg/m^3). Federal and state ambient air quality standards are presented in Table 3-5.

Table 3-5. National and State Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Federal Primary NAAQS[1,2,3]	Federal Secondary NAAQS[1,2,4]	Florida Standards
Carbon Monoxide (CO)	8-hour 1-hour	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	No standard No standard	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)
Lead (Pb)	Quarterly	1.5 µg/m^3	1.5 µg/m^3	1.5 µg/m^3
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)
Ozone (O_3)	1-hour[5] 8-hour[6]	0.12 ppm (235 µg/m^3) 0.08 ppm (157 µg/m^3)	0.12 ppm (235 µg/m^3) 0.08 ppm (157 µg/m^3)	0.12 ppm (235 µg/m^3) 0.08 ppm (157 µg/m^3)
Particulate Matter =10 Micrometers (PM_{10})	Annual 24-hour[7]	50 µg/m^3 150 µg/m^3	50 µg/m^3 150 µg/m^3	50 µg/m^3 150 µg/m^3
Particulate Matter =2.5 Micrometers ($PM_{2.5}$)	Annual 24-hour[8]	15 µg/m^3 65 µg/m^3	15 µg/m^3 65 µg/m^3	15 µg/m^3 65 µg/m^3
Sulfur Dioxide (SO_2)	Annual 24-hour 3-hour	0.03 ppm (80 µg/m^3) 0.14 ppm (365 µg/m^3) No standard	No standard No standard 0.50 ppm (1300 µg/m^3)	0.02 ppm (60 µg/m^3) 0.10 ppm (260 µg/m^3) 0.50 ppm (1300 µg/m^3)

Source: FDEP, 2000a; USEPA, 2003 (web site: www.epa.gov/air/criteria.html)

1. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than 1. The USEPA has been given the authority by the federal courts to proceed with the implementation of the new 8-hour ozone standard and the $PM_{2.5}$ standard; however, they have not been implemented at this point and are included for information only.
2. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury; ppm refers to parts per million by volume.
3. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
4. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
5. The ozone 1-hour standard still applies to areas that were designated nonattainment when the ozone 8-hour standard was adopted in July 1997.
6. The ozone 8-hour standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard.
7. The PM_{10} 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
8. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

The fundamental method by which the USEPA tracks compliance with the NAAQS is the designation of a particular region as "attainment," "nonattainment," or "unclassifiable." Areas meeting or having better air quality than the NAAQS are said to be in attainment. Areas that

exceed the NAAQS are said to be in nonattainment. Areas that cannot be classified on the basis of available information as attainment or nonattainment are defined as unclassifiable and are treated as attainment areas. Attainment areas can be further classified as maintenance areas. Maintenance areas are areas that were previously nonattainment but have reduced pollutant concentrations below the standard and must maintain some of the nonattainment area plans to stay in compliance.

All project activities occur in the Mobile (Alabama)–Pensacola–Panama City (Florida)–Southern Mississippi Interstate Air Quality Control Region (federal AQCR #5). In Florida, AQCR #5 consists of the territorial area encompassed by the jurisdictional boundaries of: Escambia County, Santa Rosa County, Okaloosa County, Walton County, Holmes County, Washington County, Bay County, Jackson County, Calhoun County, and Gulf County.

As noted above, Eglin AFB is located in AQCR 5. The USEPA has classified the Florida counties in this AQCR as attainment for all criteria pollutants (40 CFR 81.310).

Over the past few years, ground-level ozone has become a problem along the Gulf coast. Indications are that the prevailing wind patterns (land/sea breeze cycle) may be keeping pollutants (generated locally and transported into the area from out of the region) over the Florida Panhandle. Eight-hour ozone monitors have been operated in Pensacola since 1999 and Navarre and Panama City since 2000. All monitoring stations in Pensacola, Navarre, and Panama City have three complete years of data (2000–2002), the monitoring period needed to make an attainment/nonattainment designation. An exceedance of the standard was recorded in all three cities during 2000, but none have been recorded since. The three-year average for all locations is below the 8-hour standard of 85 parts per billion; therefore, all areas remain in attainment.

The new federal 8-hour standard for ozone has been established at a level equivalent to 85 parts per billion averaged over any 8-hour period. An area would be considered as nonattainment (not meeting the standard) if the average of the annual fourth highest ozone readings at any ozone monitor for any three-year period equals or exceeds 85 parts per billion.

It should also be noted that sources located within 25 miles of the state's seaward boundary are subject to federal and state air quality-related requirements as if they were located in the corresponding onshore area. Such requirements include, but are not limited to, state and local requirements for emission controls, emission limitations, offsets, permitting, monitoring, testing, and reporting. Before any agency, department, or instrumentality of the federal government engages in, supports in any way, provides financial assistance for, licenses, permits, or approves any activity, that agency has the affirmative responsibility to ensure that such action conforms to the state implementation plan for the attainment and maintenance of the NAAQS.

Identifying the affected area for an air quality assessment requires knowledge of pollutant types, source emissions rates and release parameters, proximity relationships of project emission sources to other emissions sources, and local and regional meteorological conditions. The affected area for emissions of O_3 precursors (volatile organic compounds (VOC) and nitrogen oxides (NO_x)) from the project would be the air shed (AQCR #5) surrounding Eglin AFB. However, because of the large size of the air quality control region, the affected area for O_3 and its precursors for this analysis is defined as Santa Rosa, Okaloosa, and Walton counties.

Therefore, site-related emissions of VOCs and NO_x are compared to emissions inventory generated within these counties. The affected area for the inert pollutants (CO, SO_2, Pb, PM_{10}) that do not undergo a chemical reaction in the atmosphere is limited to the immediate vicinity of the particular activity and is also compared to the Santa Rosa, Okaloosa, and Walton Counties' portion of the AQCR emissions inventory as a means of assessing potential changes in air quality.

An air emissions inventory is an effort to qualitatively and quantitatively describe the amount of emissions from a facility or within an area. Inventories are designed to locate pollution sources, define the type and size of sources, define and characterize emissions from each source, determine relative contributions to air pollution problems by classes of sources and by individual sources, and determine the adequacy of regulations. The air emissions inventory is an estimate of total mass emissions of pollutants generated from a source or sources over a period of time, normally a year. Accurate inventories are needed for estimating the interrelationship between emissions sources and air quality and for determining whether an emission source requires an operating permit based on actual emissions or the potential to emit.

The latest same-year air emissions inventories for Eglin AFB quantifies emissions from mobile sources based on 2001 calendar year activity (U.S. Air Force, 2002b) and stationary sources based on 2001 calendar year activity (U.S. Air Force, 2003b) (year 2002 emissions are not yet available for both mobile and stationary sources). The most recent county inventories quantify emissions from stationary and mobile sources based on 2001 calendar year activity (USEPA, 2003a). The 2000 air emissions inventory provides actual emissions from all identified sources.

The most current emissions inventories for Eglin AFB and Santa Rosa, Okaloosa, and Walton Counties are presented in Table 3-6. All inventories include mobile (aircraft, on-road vehicles, off-road vehicles, etc.) sources.

Table 3-6. Baseline Emissions Inventory (Tons)

Pollutant Emission Source	Pollutants (tons/year)				
	CO	**NO_X**	**PM_{10}**	**SO_X**	**VOCs**
Eglin AFB Stationary Emissions (CY2001)	72	96	101	11	109
Eglin AFB Mobile Source Emissions (CY2001)	16,935	80,823	6,143	12,672	5,752
Eglin AFB Totals	**17,007**	**80,919**	**6,244**	**12,683**	**5,861**
Santa Rosa County (CY2001)*	68,684	14,157	12,537	6,434	16,390
Okaloosa County (CY2001)*	71,952	8,296	7,363	698	11,135
Walton County Total Emissions (CY2001)*	21,368	3,475	3,508	230	3,573
County Totals	**162,004**	**25,928**	**23,408**	**7,362**	**31,098**

*Includes mobile sources Source: U.S. Air Force, 2002b; U.S. Air Force, 2003b

3.9 HAZARDOUS MATERIALS/SOLID WASTE

According to the Resource Conservation and Recovery Act (RCRA), Section 6903(5), *hazardous materials* and *waste* are defined as substances that, because of "quantity, concentration, or physical, chemical, or infectious characteristics may cause or significantly contribute to increases in mortality or serious illnesses, or pose a substantial threat to human health or the environment." Hazardous materials, as referenced here, pertain to mission-related hazardous chemicals or substances meeting the requirements found in 40 CFR 261.21.24, are regulated under RCRA, and are guided by AFI 32-7042. The hazardous materials to be used for the Proposed Action consist of fuels, munitions, and pyrotechnics.

Under federal law, the transportation of hazardous materials is regulated in accordance with the Hazardous Materials Transportation Act, 49 USC 1801 et seq. For the transportation of hazardous materials, Florida has adopted federal regulations that implement the Hazardous Materials Transportation Act, found at 49 CFR 178. Transportation of hazardous materials is not a component of the Proposed Action or Alternatives.

State laws pertaining to hazardous materials management include the Florida Right-to-Know Act, Florida Statutes Title 17, Chapter 252, the Hazardous Waste section of the Florida Department of Environmental Protection (FDEP), and the Florida Department of Transportation (FDOT) Motor Carrier Compliance Department that implements 49 CFR 178 under Florida statute annotated Title 29 Section 403.721.
AAC Plan 32-9, Hazardous Materials Management, describes how Eglin complies with federal, state, Air Force, and DoD laws and instructions. All Eglin AFB organizations and tenants are required to follow this plan.

3.9.1 Debris

Debris includes the physical materials that are deposited on the surface of terrestrial or aquatic environments during mission activities. The potential impacts are primarily related to physical disturbances to people, wildlife, or other users of the range, and chemical alterations that could result from the residual materials.

3.9.2 Chemical Materials

Chemical materials encompass liquid, solid, or gaseous substances that are released to the environment as a result of mission activities. These would include munitions and pyrotechnic combustion by-products, residual fuel leaks or spills, and untreated bilge release. Release of these materials may potentially affect air quality, water quality, soils, and sediments.

Installation Restoration Program (IRP)

The Installation Restoration Program (IRP) is used by the Air Force to identify, characterize, and remediate past environmental contamination on Air Force installations. Although widely accepted at one time, the historic procedures followed for managing and disposing of wastes have resulted in contamination of the environment at some sites. The IRP has established a process to evaluate past disposal sites, control the migration of contaminants, identify potential hazards to human health and the environment, and remediate the sites. Regulations affecting IRP

management at Eglin integrate investigative and remedial protocols of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA) processes, as well as state environmental compliance programs, primarily those found in the Florida Administrative Code (FAC) 62-770, Petroleum Contamination Site Cleanup Criteria. IRP sites on Eglin AFB are detailed in the *Installation Restoration Program Management Plan* (U.S. Air Force, 2000).

Environmental Fate of Munitions Residue

Once released into the environment, the fate and transport of chemicals through water and soil are complex phenomena. Organic molecules from explosives formulations or molecules generated during explosive detonations can interact with soil components and soil water; move through the soil by diffusion and advection; change from vapor state; dissolve in soil water; be sorbed on stationary soil solid phases; and be chemically transformed by microorganisms and soil minerals. Metals released to the soil would typically be much less mobile in the environment. Movement of metals into other environmental compartments (i.e., groundwater, surface water, or the atmosphere) is expected to be minimal as long as the retention capacity of the soil is not exceeded. The extent of movement of a metal in the soil system is intimately related to the solution and surface chemistry of the soil and to the specific properties of the metal and associated waste matrix. Changes in the chemical environment (especially pH and reduction/oxidation conditions) may result in very different relative chemical mobility for the components. Acidic and/or reducing conditions may increase dramatically the mobility of the metals in the environment. Environmental fate and transport characteristics of chemicals common to munitions or munition residues are presented in Appendix A, Chemical Fate and Transport and Toxicity Assessment of Ordnance.

The primary release mechanisms are residues associated with the successful detonation of munition items or residues associated with the breakup, either on impact or due to subsequent corrosion, of UXO. Both of these mechanisms would result in release of metallic and organic compounds to the ground. Additionally, the detonation process would release a variety of organic, inorganic, and metallic compounds to the air as gases, vapors, or particulates.

Depending on the medium and chemical released, migration of contaminants would occur through percolation of liquid into shallow groundwater or through runoff carrying contaminated particles into surface water. Contaminant soil transport would only be significant if soils were transported off-site. Surface water has the potential to be impacted by overland flow crossing test areas and picking up contaminants that are transported to streams. Shallow groundwater could be impacted if explosives or their metabolites were transported from soils to groundwater. Potential receptors of munition residue include on-site personnel, recreational users/trespassers, adjacent residents, and aquatic and terrestrial biota.

3.10 SENSITIVE SPECIES

Sensitive species include those with federal endangered or threatened status, federal candidate species, state endangered or threatened, and species of special concern status (U.S. Air Force, 1995). An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species that is likely to become

endangered in the future throughout all or a significant portion of its range due to loss of habitat, anthropogenic effects, or other causes. Federal candidate species and all state-listed species are those that should be given consideration during planning of projects, but have no protection under the Endangered Species Act.

Eglin Natural Resources Branch (AAC/EMSN) protects state-listed species through habitat management, specifically through the management of habitats identified as conservation targets by the Nature Conservancy. By addressing the needs of conservation targets, which are sensitive, essential habitat, and cornerstone species, AAC/EMSN indirectly supports the management of other species and habitat, including state-listed species.

Okaloosa Darter (*Etheostoma okaloosae*)

The Okaloosa darter is found in six small Choctawhatchee Bay basin tributaries located in the Sandhills ecological association of the Eglin Mainland Reservation (shown in Figure 3-2). The darter's diet consists primarily of immature aquatic insect larvae. Spawning occurs from March to October, with the greatest amount of activity taking place during April. The spawning occurs in beds of clean, current swept macrophytes (large aquatic plants). Okaloosa darter habitat is sensitive to a variety of disturbances. Erosion can increase siltation and imperil the darter's habitat. Its range has also been reduced by habitat modification and encroachment by the brown darter. To protect the Okaloosa darter, the quantity and quality of water in the streams must be protected (USFWS, 1998).

For the Okaloosa darter, density estimates based on information presented in the *Test Area C-74 Biological Opinion* (USFWS, 2002) indicate an average density of about 0.4 darters per meter within identified darter streams.

Red-cockaded Woodpecker (*Picoides borealis*)

The red-cockaded woodpecker (RCW), a federally endangered and state-listed threatened species, inhabits the interstitial areas of the Eglin Reservation (Figure 3-2). On Eglin, the RCW typically inhabits mature, open stands of longleaf pine. The RCW does not migrate and maintains year-round territories near nesting and roosting trees (Hooper et al., 1980). Studies by DeLotelle et al. (1987) in central Florida found that RCWs foraged primarily in longleaf pine and pond cypress stands with dense ground cover of broomsedge bluestem (*Andropogon virginicus*).

The woodpeckers primarily feed on spiders, ants, cockroaches, centipedes, and insect eggs and larvae that are excavated from trees. Dead, dying, and lightning-damaged trees that are infested with insects are a preferred feeding source. The birds also feed on the fruits of black cherry (*Prunus serotina*), southern bayberry (*Myrica cerifera*), and black tupelo (*Nyssa sylvatica*) (Baker, 1974).

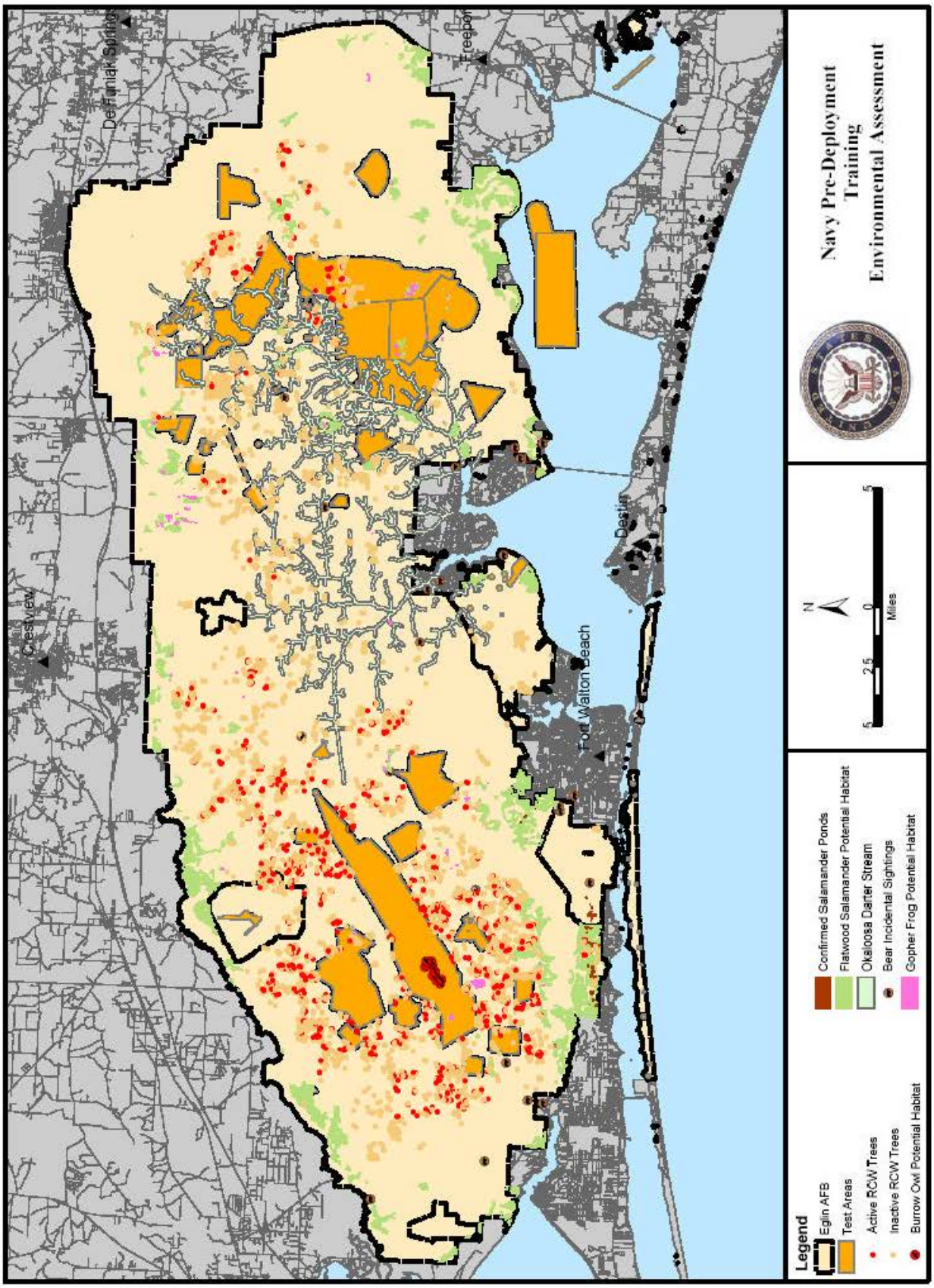

Figure 3-2. Sensitive Species Locations at Eglin AFB

High quality RCW forage habitat consists of open pine stands with tree dbh (diameter at breast height) averaging 9 inches and larger. While 100 acres of mature pine is sufficient for some groups, clans commonly forage over several hundred acres where habitat conditions are not ideal (Jackson et al., 1979). The greatest threat to the RCW populations is loss and fragmentation of their habitat. As a result of active management, RCW populations on Eglin have continued to increase with the number of active clusters growing from an estimated 217 in 1994 to 309 in 2002 (Moranz and Hardesty, 1998; Miller, 2003) (Figure 3-3).

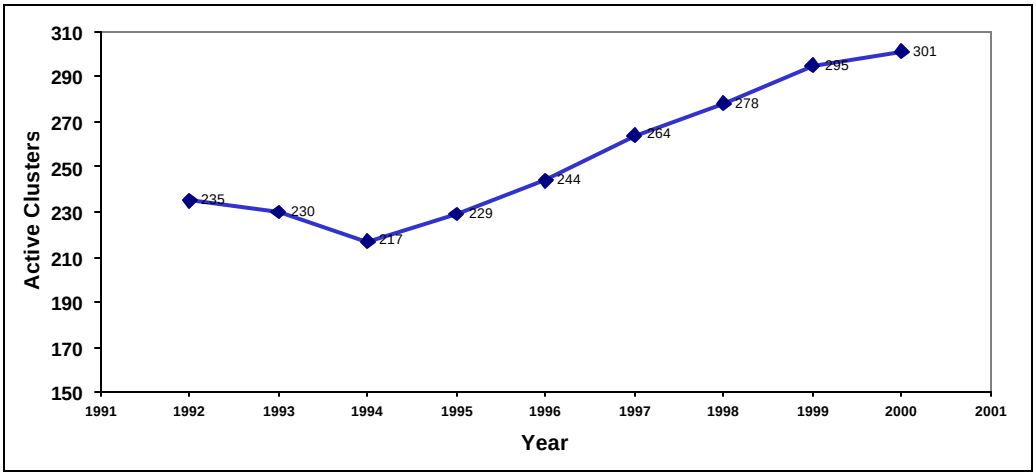

Figure 3-3. Eglin RCW Population Trend

An RCW cluster typically encompasses about 10 acres with the majority of cavity trees most likely within a 1,500-foot diameter circle. The RCW has shown some preference for mature longleaf pine over other pine species as a cavity tree, with the average age of longleaf pines in which new cavities have been excavated being 95 years. Cavity excavation may take several years and may be utilized by generations of birds for more than 50 years (Jackson et al., 1979).

Flatwoods Salamander (*Ambystoma cingulatum*)

The flatwoods salamander is a small mole salamander about 5 inches in length when fully mature (*Federal Register*, 1999). Habitat for the flatwoods salamander consists mainly of open, mesic (moderate moisture) woodland of longleaf and slash pine flatwoods maintained by frequent fires. Adult flatwoods salamanders breed during the rainy season from October to December (Palis, 1997). Their breeding sites are isolated flatwoods depressions that dry completely on a cyclic basis and are generally shallow and relatively small. Flatwoods salamander breeding sites in proximity to test areas used by the Proposed Action are shown in Figure 3-2. Since the salamander may disperse over long distances to and from breeding sites to upland sites where they live as adults, desiccation (drying out) can be a limiting factor in their movements. As a result, it is important that areas connecting their wetland and terrestrial habitats are protected to provide cover and appropriate moisture regimes during their migration.

Eastern Indigo Snake (*Drymarchon corais couperi*)

The eastern indigo snake was federally listed as threatened in 1978 (*Federal Register* Vol. 43, No. 52:11082–11093), and is also a state-listed threatened species. The eastern indigo snake is

the largest nonvenomous snake in North America and can grow up to 125 inches in length. The Florida Panhandle has a few known small populations of the eastern indigo snake, but it is generally considered rare in the region. On Eglin AFB, these snakes can be found in a wide variety of habitats. However, during winter denning season (December through April) they are most likely to be found in upland sandhill habitats, usually in association with gopher tortoise burrows. During other seasons, indigos can be found in almost any other habitat type but are most likely to be found foraging or seeking shade on the edges of wetlands or in creek bottoms. Sightings on Eglin AFB have been sparse, with only 18 incidental sightings between 1974 and 1999 (U.S. Air Force, 2002a). Most sightings on Eglin have been roadkills.

Florida Burrowing Owl (*Athene cunicularia floridana*)

The Florida burrowing owl is not federally listed but is protected under the Federal Migratory Bird Treaty and is listed by the state of Florida as a species of special concern. On Eglin, a breeding population of burrowing owls can be found on TA B-70, where owls benefit from prairie-like grassland habitat created by maintenance of the grass grid and frequent, mission related fires. Volunteers from the Choctawhatchee Audubon Society monitor this population monthly. Surveys indicate that the population is stable, suffering little from frequent mission activity on the range (Fenimore, 2003). Proposed COMPTUEX/JTFEX activities may occur near Eglin's burrowing owl population.

Florida Black Bear (*Ursus americanus floridanus*)

The Florida black bear, state-listed as threatened, has been sighted throughout Eglin. The bear population on Eglin is Florida's fifth largest population of the subspecies. Black bears inhabit swampy areas, flatwoods, stream riparian areas, and the pine-oak forests of the Sandhills. They prefer wooded and shrubby areas, but would use meadows, clear-cuts, burned areas, riparian areas, and forested areas as travel corridors. During winter, the bears may hibernate in tree cavities, under logs and rocks, in banks, caves, or culverts, and in shallow depressions (Hamilton and Marchinton, 1980). Black bears eat a variety of foods relying most heavily on grasses, herbs, fruits, and mast. They also feed on carrion and insects (Jonkel, 1978).

Gopher Tortoise (*Gopherus polyphemus*)

The gopher tortoise is currently listed by the state of Florida as a species of special concern. Gopher tortoise burrows are essential to the ecosystem of dry, sandy uplands because they provide shelter for the gopher tortoise as well as many other species, including such sensitive species as the indigo snake, pine snake, and gopher frog. The number of active burrows on Eglin appears to be low when compared to the amount of suitable habitat. Gopher tortoise burrows have been noted at TA B-12, C-52C, C-52E, B-70, and C-62 and at Eglin Main (U.S. Air Force, 1995).

The exact locations of all gopher tortoise burrows on each test area and throughout the interstitial areas of the reservation are not known, as the most recent survey was conducted in 1994, which may not represent the current situation. However, a relative density can be estimated using previous gopher tortoise survey data from Test Areas C-52 and C-62. According to the 1994 survey information, there were 6.6 and 8.9 active burrows/100 acres on surveyed portions of C-52 and C-62 respectively. Since habitats are similar throughout the test areas, it is assumed that gopher tortoises are present in comparable densities. An average of C-52 and C-62 active

gopher tortoise burrow densities was used to estimate density of active burrows on all test areas under the Proposed Action and Alternatives at 8 active burrows/100 acres. Inactive burrows also averaged 8 burrows/100 acres for C-52 and C-62. Therefore, gopher tortoise burrows are assumed to be evenly distributed throughout the test areas at a density of 8 active burrows/100 acres, and 8 inactive burrows/100 acres. Inactive burrows are often used by other species, some of which are classified as state species of special concern, such as the burrowing owl and gopher frog. Indigo snakes are a federally threatened species that have been known to inhabit gopher tortoise burrows elsewhere, but the documentation of their presence on these test areas is based on occasional sightings over the past 30 years.

Proposed COMPTUEX/JTFEX ordnance expenditures may occur in areas with active and inactive gopher tortoise burrows.

Florida Pine Snake (*Pituophis melanoleucus*)

The Florida pine snake, a state species of special concern, is a large (up to 8.3 feet), white, tan, and black serpent. The snake is typically found in Sandhill sandy soil areas, occurring primarily in longleaf pine/turkey oak forests. Male and female snake home ranges have been reported to vary from 3 to 68 acres. The snakes primarily feed on small mammals, birds and their eggs, lizards, other snakes and their eggs, and insects. Nests are excavated in exposed, unvegetated soft-packed soil with little or no organic matter to a depth of 9 to 12 inches. Nest clearings average 166 feet long and 260 feet wide on slopes of less than 14 degrees. As with the eastern indigo snake, the pine snakes are known to use active and inactive gopher tortoise burrows. Habitat loss and degradation are primary reasons for population declines of this species (Jordan, 1998).

Snowy Egret (*Egretta thula*)

The snowy egret is a small, white, yellow-toed wading bird designated as a species of special concern by the Florida Fish and Wildlife Conservation Commission (FWC, 2003). The breeding distribution of this species ranges from northern California east to South Dakota and south to Florida and parts of the Caribbean and South America. In Florida, breeding season lasts from January through August. Snowy egrets spend the winter months in the southernmost parts of their breeding range, the U.S. southeast, and in southern California. In the Florida Panhandle, colonies of snowy egrets nest primarily in swamps or in emergent vegetation in conjunction with other species of wading birds. This species forages in both freshwater and saltwater habitats for fish, shrimp, and small vertebrates (FWC, 2003).

Little Blue Heron (*Egretta caerulea*)

The little blue heron, closely related to the snowy egret, is listed as a species of special concern by the state of Florida because of its dependence on wetlands, which are diminishing (FWC, 2003). While it is not rare in coastal areas, it seems to prefer freshwater habitats. The little blue heron is a solitary feeder but a colonial nester that often occurs with other species of wading birds. Its diet consists of insects, shrimp, amphibians, and fish. In Florida, breeding occurs from April through September, and migrations may occur in the panhandle from February through March (FWC, 2003).

Tricolored Heron (*Egretta tricolor*)

The tricolored heron is a slim, medium-sized heron with a head and upper body that is dark slate blue in color with purple coloration on its chest. This species, formerly known as the Louisiana Heron, is designated a state species of special concern. Breeding occurs from February through August. This species nests in colonies, often with other heron and ibis species, from Massachusetts down to the Caribbean and northern Brazil. It is a solitary feeder, foraging in both fresh and saltwater habitats (FWC, 2003).

White Ibis *(Eudocimus albus)*

The white ibis has been designated a species of special concern by the Florida Fish and Wildlife Conservation Commission due to species declines (FWC, 2003). Coastal islands, freshwater marshes or ponds, and standing water provide breeding habitat for this species. The white ibis usually nests from March to August but has been known to nest from February through October in the Florida Panhandle. The white ibis migrates generally in February and in September-October. It is rare or absent from the Panhandle during the winter months. Prey organisms include crayfish, crabs, insects, snakes, frogs, toads, and fish (FWC, 2003).

Southeastern American Kestrel (*Falco sparverius paulus*)

The southeastern American kestrel, state-listed as threatened, is a common permanent resident of Eglin. This small raptor typically preys on small rodents, reptiles, and insects in clearings or woodland edges. The kestrels occupy nearly all Grassland/Shrubland, Sandhills, and other forested community types. Habitat requirements include an adequate prey base, perch sites, and nesting sites. They mostly inhabit open forests and clearing edges with snags. The thick understory and midstory in Sandhills communities that are cut or are not burned may have an adverse effect on kestrel populations. Prescribed burning can be beneficial since it enhances habitat and increases the prey base (Hoffman and Collopy, 1988).

Nests are normally located along the forest edge and may be used for several years. The kestrels prefer to nest in tight-fitting live tree cavities and snags created by other birds (DeGraff et al., 1991). The birds most frequently locate their nests in abandoned red-cockaded woodpecker and other woodpecker holes in longleaf pines 12 to 35 feet above the ground. Natural cavities and snags in turkey oaks and live oaks may also be used as nesting sites (Hoffman and Collopy, 1987).

The kestrels are quite tolerant of human activity around their nests. They are frequently flushed or caught at the nest without desertion. In Ohio, kestrels use centers of human activity more than other raptors (Fischer et al., 1984).

Dusky Gopher Frog (*Rana capito sevosa*)

Dusky gopher frogs, state-listed as a species of special concern, are associated with gopher tortoise habitat, as they use gopher tortoise burrows for cover, but are also known to flourish where the tortoises no longer occur. They will also use old field mouse burrows, hollow stumps, and other holes for cover. The species requires nearby seasonally flooded grassy ponds, depression marshes, and some Sandhills upland lakes that lack fish populations, found within the Sandhills ecological association, for breeding. They have been found in the longleaf pine, turkey

oak, pine flatwood, sand pine scrub, and xeric hammock open or forested communities of the Sandhills and Open Grassland/Shrubland ecological associations up to 2 kilometers from the breeding ponds. Eglin supports the largest known concentration of reproductive sites of the dusky gopher frog subspecies anywhere within its range (FNAI, 2001).

Sherman's Fox Squirrel (*Sciurus niger shermani*)

Sherman's fox squirrel, state-listed as a species of special concern, is a large tree squirrel with a variable fur color ranging from black to silver, long tail, and typically black head and white ears and muzzle. The squirrel typically nests in oak trees found in the Sandhills and Flatwoods ecological associations, feeding on longleaf pinecones and seeds. Habitat destruction from tree plantation conversion and development are the main threats to this species. Encroachment of shrubby vegetation due to lack of fire is also a factor in habitat degradation (FNAI, 2001).

Summary of Sensitive Species Locations

Table 3-7 provides identification and proximity of sensitive resources closest to potential targets.

Table 3-7. Targets and Proximity to Nearest Sensitive Species

Location	Target	Nearest Known Sensitive Species	Proximity (feet)	W/in TA Boundary
TA A-77	TT-1	Active RCW Tree	> 2,000	No
	TT-2		> 2,500	
	TT-3		> 3,000	
	TT-4			
	TT-5			
	TT-6		> 2,000	
	TT-7		> 2,500	
	TT-8		> 3,000	
	TT-9		> 5,000	
	TT-10			
	TT-11			
	TT-12		> 4,500	
	TT-13		> 4,000	
	TT-14		> 3,000	
	TT-15		> 2,500	
	TT-16			
	TT-17			
TA B-12	TT-1	Active RCW Tree	>1,000	No
	TT-3		>2,000	

Continued

Table 3-7. Targets and Proximity to Nearest Sensitive Species Cont'd

Location	Target	Nearest Known Sensitive Species	Proximity (feet)	W/in TA Boundary
TA C-52N	TT-1	Active RCW Tree / Okaloosa Darter Stream	> 5,000 / > 2,000	Yes/Yes
	TT-1A			
	TT-2		> 7,000 / > 2,000	
	TT-4		> 4,000 / > 3,000	
	TT-5		> 3,500 / > 2,000	
	TT-6		> 4,500 / > 4,000	
	TT-7		> 6,500 / > 3,500	
	TT-8		> 7,000 / > 5,000	
	TT-9		> 10,000 / > 3,500	
	TT-10		> 11,000 / > 3,000	
	TT-12		> 7,500 / > 6,000	
	TT-17		> 6,000 / > 2,500	
	TT-18		> 5,000 / > 2,000	
	TT-19		> 11,000 / > 2,000	
	TT-23		> 4,500 / > 4,500	
	TT-25		> 8,500 / > 3,500	
	TT-30		> 10,000 / > 2,500	
TA C-62	TT-1	Active RCW Tree	< 5,000	No
	TT-3		< 10,000	
	TT-4			
	TT-6			
	TT-7			
TA B-70	TT-1	Active RCW Tree/Burrowing Owl	> 3,500 / > 5,500	No/Yes
	TT-2		> 5,500 / > 3,500	
	TT-3		> 5,500 / > 600	
	TT-4		> 5,000 / > 400	
	TT-5		> 3,500 / > 2,000	
	TT-6		> 1,500 / > 3,000	
	TT-7		> 6,000 / > 1,500	
	TT-8		> 1,500 / > 3,000	
	TT-9		> 3,000 / >3,000	
	TT-10		> 4,000 / > 1,500	
	TT-11		> 2,500 / > 8,000	
	TT-12		> 4,000 / >1,500	
	TT-13		> 5,000 / > 1,000	
	TT-14		> 5,000 / > 3,500	
	TT-15		> 3,000 / > 2,000	
	TT-16		> 6,000 / > 15,000	
	TT-19		> 3,000 / > 2,500	
	SW Corner	Gopher Frog (pond)	> 4,000 from any TT	Yes

Continued

Table 3-7. Targets and Proximity to Nearest Sensitive Species Cont'd

Location	Target	Nearest Known Sensitive Species	Proximity (feet)	W/in TA Boundary
TA C-72	TT-1	Active RCW Tree / Okaloosa Darter Stream * Proximity for darter streams reflects distance to 325 foot protective buffer	> 7,500 / > 1,500	No/Yes
	TT-3			
	TT-7		> 8,000 / > 500	
	TT-8		> 9,000 / > 325	
	TT-9		> 9,500 / > 75	
	TT-12		> 8,500 / > 400	
	TT-13		> 8,000 / > 400	
	TT-14		> 9,500 / > 500	
	TT-15		> 8,000 / > 700	
	TT-63		> 6,500 / > 800	
	TT-64		> 10,000 / > 300	
	TT-65		> 6,500 / > 2,000	
	TT-66		> 7,500 / > 2,000	
	TT-67		> 5,500 / > 400	
	TT-74		> 2,500 / > 2,000	
	TT-75		> 3,500 / > 1,500	
	TT-77		> 4,500 / > 25	
	TT-82		> 8,000 / > 2,000	
	TT-83		> 4,000 / > 600	
	TT-84		> 2,500 / > 2,500	
	TT-85		> 3,500 / > 8,000	
TA B-82	TT-1	Active RCW Tree	> 2,000	No

Depending on the location within the interstitial area and of the HLZ, a variety of species may be found. The location of sensitive species associated with these areas is shown in Figure 3-2.

3.11 SENSITIVE HABITATS

Sensitive habitats found within or adjacent to COMPTUEX/JTFEX subject test areas include wetlands (discussed in more detail in Section 3.5), Florida Natural Areas Inventory (FNAI) Tier I vegetative communities, and FNAI Significant Botanical sites (U.S. Air Force, 1996a). No critical habitat for sensitive species exists on test areas as identified by the USFWS.

Wetlands

Activities that may affect wetlands (protected by the Clean Water Act) go through a permit process with the state as well as with the U.S. Army Corps of Engineers (USACE). Activities minimizing impacts to wetlands are preferred, and the planning process should reduce or minimize ground-disturbing projects or actions occurring in a wetland (U.S. Air Force, 1995). Wetlands are most prominent in the Swamp ecological association, although some wetlands are also found in the Flatwoods ecological association. The Swamp ecological association, which is predominantly wetlands, covers approximately 37,000 acres of Eglin AFB. Figure 3-4 shows wetland areas on Eglin Air Force Base as identified in the National Wetlands Inventory (NWI).

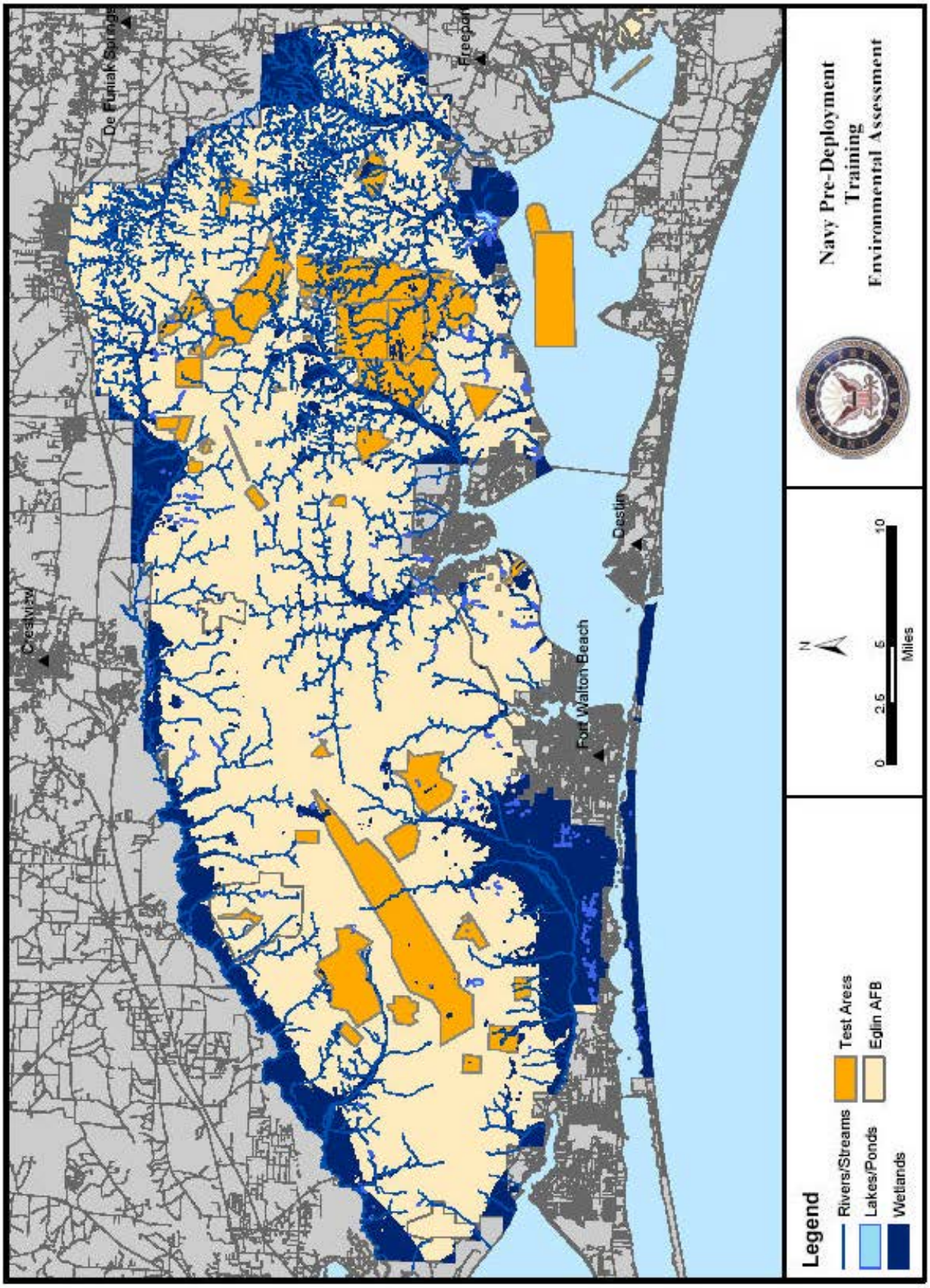

Figure 3-4. Eglin AFB Wetlands

FNAI Tier I Vegetative Communities

The mission of FNAI is to collect, interpret, and disseminate ecological information critical to the conservation of Florida's biological diversity. FNAI maintains a statewide database on the distribution, status, and management of exemplary natural communities; endangered and rare plants and animal taxa; and managed areas in Florida. FNAI classifies land areas into the following four-tiered classification system (FNAI, 1995).

- Tier I: Vegetative communities that are in or closely approximate their natural state and undisturbed condition. The goal of management is to maintain the natural community.
- Tier II: Vegetative communities that retain a good representation and distribution of associated species typical of the undisturbed state, but have been exposed to moderate amounts and intensities of disruptive events. Through careful management, the community may be restored or maintained.
- Tier III: Vegetative communities that do not retain good representation and distribution of associated species and have been exposed to severe amounts and intensities of disruptive events. Significant and intensive management over extended periods would be required to restore these communities (pine plantations, etc.).
- Tier IV: Areas on Eglin that have a designated land use, such as test areas, developed areas, sewage disposal areas, roads, power line rights-of-way, and other uses. The nature of the designated use determines the management goal.

This classification system has been applied to reservation land at Eglin AFB. Consequently, several Tier I communities have been identified (Figure 3-5). Tier I *hydric/mesic* communities are the most sensitive to degradation. There are approximately 2,000 acres on the Eglin Reservation that have been designated as Tier I hydric/mesic communities.

FNAI Significant Botanical Sites

Chafin and Schotz (1995) identified 16 areas on the Eglin Reservation as significant botanical sites due to value as habitat for rare plant species or because of the high quality or rarity of their natural vegetative communities on Eglin. Special protection at these sites is warranted for two reasons: 1) high density of federal and state-protected plant species, and 2) uniqueness of habitat that supports sensitive animals as well as plants. No state-listed threatened and endangered plant species at these sites can be taken or disturbed unless a permit is authorized by the Florida Fish and Wildlife Conservation Commission (FWC). In addition, habitat that supports federally listed species must be conserved in accordance with the Endangered Species Act. These sensitive sites constitute about 20,000 acres on Eglin AFB (Figure 3-5).

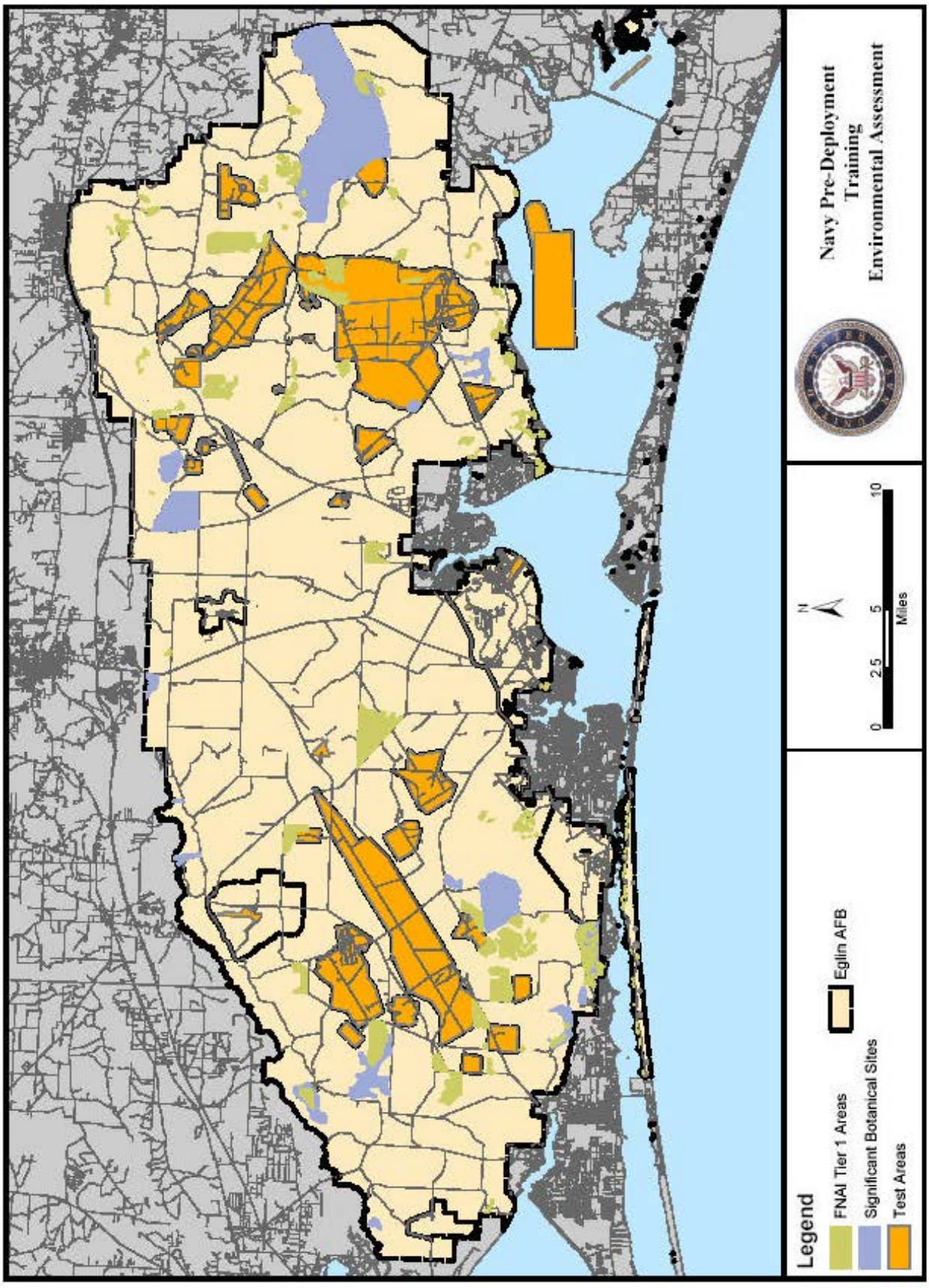

Figure 3-5. Eglin AFB Tier I Areas and Significant Botanical Sites

3.12 CULTURAL RESOURCES

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activity considered important to a culture or community for scientific, traditional, religious, or other reasons. Historic properties are cultural resources included in, or eligible for inclusion in, the National Register of Historic Places (National Register) maintained by the National Park Service. The National Register includes artifacts, records, and remains that are related to and located within such properties. As part of a federal agency, the U.S. Navy and Eglin Air Force Base are required under the National Historic Preservation Act of 1966, as amended (NHPA), to consider the effects of their undertakings on historic properties listed, or eligible for listing, in the National Register.

Under Section 106 of the NHPA, when a federal action meets the definition of an undertaking, the federal agency must consult with the State Historic Preservation Officer (SHPO) and any other identified consulting parties. The federal agency is responsible for determining whether any historic properties are located in the area and assessing whether the proposed undertaking would adversely affect the resources. The federal agency is also responsible for notifying the SHPO and the Advisory Council on Historic Preservation of any adverse effects. An *adverse effect* is defined as any action that may directly or indirectly alter the characteristics that make the property historic (and thus eligible for listing on the National Register). The federal agency then consults with the SHPO to develop measures to avoid, minimize, or mitigate the adverse effects of the federal undertaking.

In addition to the SHPO, the NHPA mandates that federal agencies consult with federally recognized Indian tribes to identify, evaluate, and treat historic properties that have religious or cultural importance to those groups. Eglin has completed a study to establish formal government to government relationships with federally recognized tribes that have historic ties to the local area. These tribes would then be consulted to identify Eglin properties of importance to them. To date no traditional cultural properties have been identified on Eglin AFB.

More than 1,800 archaeological sites have been identified on Eglin AFB. Approximately 300 sites are eligible or potentially eligible for listing on the National Register. These must be considered during the planning and execution of any federal undertaking that has the potential to affect them.

Archaeological sites that are eligible for the National Register tend to be located in areas that in prehistoric times contained the natural resources necessary to sustain life, particularly areas on or near streams, rivers, and shorelines.

To comply with all applicable laws and regulations, the cultural resources management program at Eglin proceeds in phases that reflect the federal mandate to identify, evaluate, and consider the effects of its actions on historic properties. Identification of historic properties is conducted through systematic archaeological surveys (often referred to as Phase I surveys) directed by professional archaeologists.

Each archaeological site identified in the area of potential effect must also be evaluated for National Register eligibility. Data must be gathered to which the criteria of eligibility can be

applied to assess significance. For archaeological sites, the data are gathered through a combination of literature review and a program of test excavation under the direction of a professional archaeologist. This process is otherwise known as Phase II test and evaluation. Until a formal Phase II evaluation is accomplished, all archaeological resources are to be treated as potentially eligible for listing on the National Register and protected as if they are listed. Resources determined ineligible through formal testing do not require further consideration.

If an archaeological site is threatened with an adverse effect, measures must be developed in consultation with the SHPO to resolve the adverse effect. Avoidance of the property is the preferred method because it preserves the resources *in situ.* Where avoidance is not possible, data recovery (Phase III) excavations are warranted.

Data recovery represents the last stage of intensive investigation at an archaeological site. It is the preferred alternative when significant archaeological sites cannot be avoided. The data recovery process involves the systematic removal of the artifacts (data) from their original context for analysis and permanent storage. The threat of an adverse effect is mitigated through a program of work that maximizes the amount of information retrieved from a site through controlled, systematic, and intensive excavation. The data recovery may be directed at all or only a portion of a significant site, depending upon the footprint of the area of potential effect.

Before data recovery can be undertaken, a work plan must be developed and submitted to the SHPO for concurrence. This work plan development may require an interim phase between data recovery and testing to delineate cultural resources and to sample the contents in such a manner as to provide sufficient information to formulate a work plan that would ensure a representative sample of the site has been investigated. The percentage of the site subjected to data recovery would be specific to each property being investigated but generally does not exceed 10 percent of the total site area.

Description of Existing Conditions

This section contains information on known cultural resource sites that are listed, eligible, or potentially eligible for listing on the National Register that could be adversely impacted by the Proposed Action.

Auxiliary Fields and Landing Zone East

No cultural resources are located at Auxiliary Fields 2, 4, and 10. None are known to be located at Auxiliary Field 8, but portions of this field are scheduled for survey. Table 3-8 summarizes the known cultural resources located at the auxiliary fields on the Eglin Reservation. This is not a complete list. Archaeological surveys, when conducted, are likely to locate additional significant resources.

Table 3-8. Cultural Resources Sites – Auxiliary Fields

Location	Site #	Eligibility for NRHP	Comments
Aux. 7 / B-12	8SR19	Eligible	Late woodland village and possible historic saw mill.
Aux. 7 / B-12	8SR1426	Potentially Eligible	One of very few sites on Eglin that contains an early Archaic component.

Test Areas

Table 3-9 and Figures 3-6 and 3-7 provide a summary of the cultural resources that are associated with the test areas on the Eglin Reservation. Ranges A-77 and B-70 have been surveyed and are known to be free of cultural resources. All other ranges have high probability areas that require survey, have been surveyed but contain historic properties requiring protection, or a combination of both.

Table 3-9. Cultural Resources Sites – Test Areas

Location Test Area	Site #	Eligibility for NRHP	Comments
A-77	None		Clear of cultural concerns.
B-12	8SR19	Eligible	Late woodland village and possible historic saw mill.
B-70	None		Clear of cultural concerns.
B-71	None known		Range is clear; however HPA areas on perimeter have not been surveyed.
C-72	Subpens	Potentially Eligible	Replicas of German subpens built in 1944 in support of WWII. Scheduled for evaluation.
C-72	Tunnels	Potentially Eligible	Replica of tunnels in Vietnam.
C-52N		HPA	Needs survey.
C-62	8WL0111	Potentially Eligible	
C-62			Surveyed, sites are present. Awaiting details.

3.12.1 Environmental Justice

On 11 February 1994, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued with the directive that during the National Environmental Policy Act (NEPA) process, federal agencies must adopt strategies to address the environmental concerns of minority and low-income communities that may be impacted by the implementation of federal actions. The intent of the Executive Order is to ensure that no individual or community, regardless of race, ethnicity, or economic status, bears a disproportionate share of adverse environmental impacts to human health or environmental condition resulting from the execution of federal actions. The purpose of environmental justice analysis is to identify disproportionate human health and safety and environmental impacts on specific socioeconomic groups (i.e., minorities and low-income communities) and identify appropriate alternatives.

The Environmental Justice issues that need to be addressed regarding the Proposed Action for the training areas are public access to recreation areas on Eglin Reservation and noise from increased operations.

The access of the public to the water areas and land recreation areas during mission activities is restricted regardless of socioeconomic status for safety and security reasons and does not adversely impact individuals or communities of concern. Any increase in noise would primarily affect communities along the Eglin boundaries. Adverse impacts to subsistence fishing or hunting associated with the Proposed Action have not been identified.

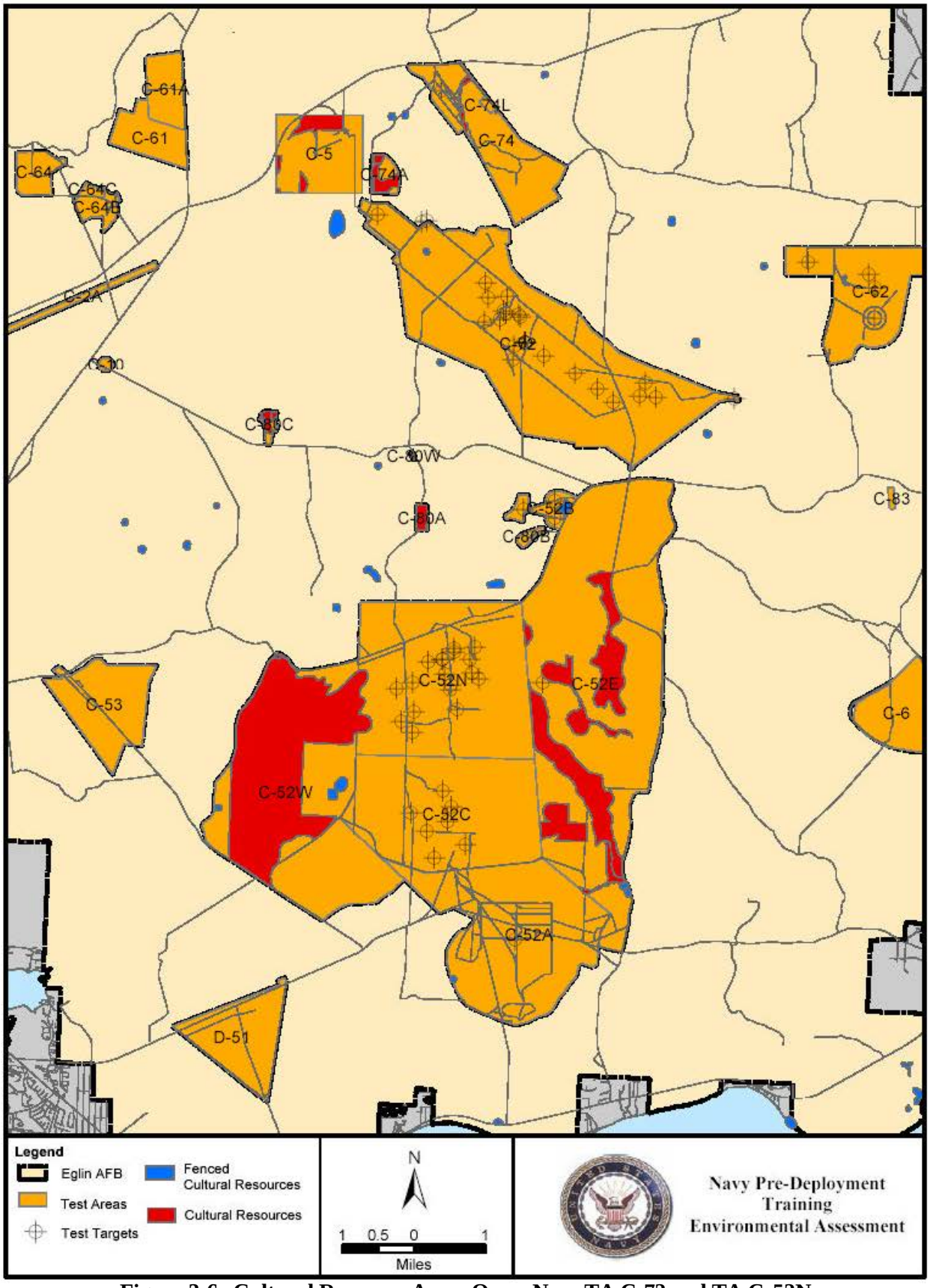

Figure 3-6. Cultural Resource Areas On or Near TA C-72 and TA C-52N

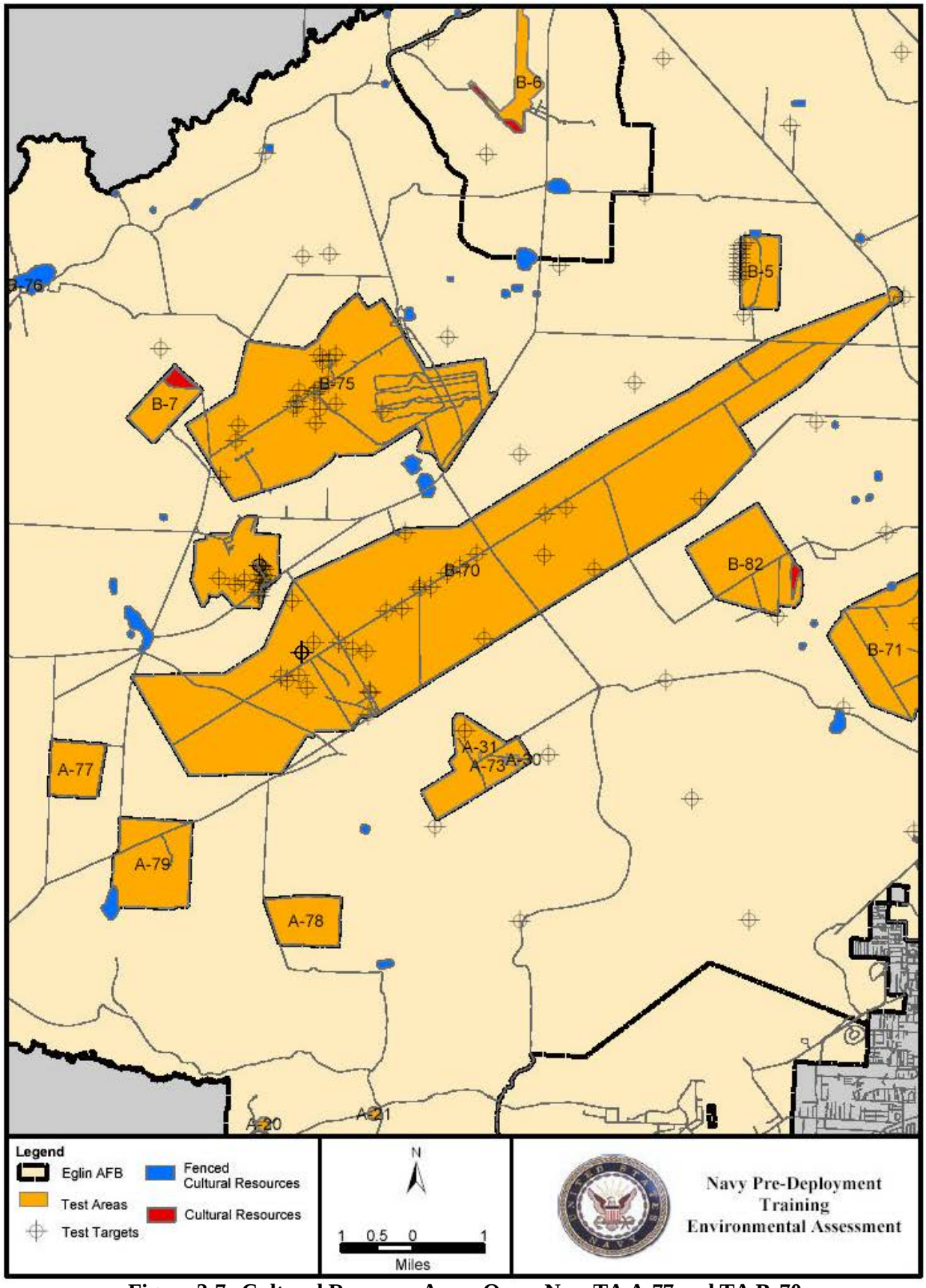

Figure 3-7. Cultural Resource Areas On or Near TA A-77 and TA B-70

The Executive Order also requires the application of equal consideration for Native American programs. This may include the protection of Native American tribal lands and resources such as treaty-protected resources, cultural resources, and/or sacred sites. This issue, along with the associated public participation mechanisms, is fully addressed via Eglin's compliance with the following.

- The Antiquities Act of 1906
- The Sites Act of 1935
- The National Historic Preservation Act of 1974
- The Archaeological Resources Protection Act of 1979
- The Native American Graves Protection and Repatriation Act of 1990
- The American Indian Religious Freedom Act

Procedures for compliance with the above laws are outlined in Eglin's Cultural Resource Management Plan (U.S. Air Force, 1997). As a result, an additional analysis was not included in this Environmental Assessment.

4. ENVIRONMENTAL CONSEQUENCES

4.1 SOCIOECONOMICS

4.1.1 Proposed Action

Population and Economy

Under the Proposed Action, there would be no net change in the number of permanent or transient military in the Okaloosa, Santa Rosa, and Walton Counties area. Consequently, there would be no changes to the population structure or dynamics as a result of the COMPTUEX/JTFEX training. No changes to the local population would occur as participants of these exercises would return to ships in the Gulf.

Employment

There would be no shift in employment trends as a result of the Proposed Action because no permanent new military activities would be occurring in the Eglin area.

Restricted Access

Because all training activities would occur on the Eglin range in areas that are closed to the public, there are no restricted access issues.

4.1.2 Alternative 1

This alternative represents a lower daily intensity of COMPTUEX/JTFEX training as the COMPTUEX exercises would be conducted over a 5-day period as opposed to 9-day period. The potential for socioeconomic impacts is the same for this alternative as under the Proposed Action, meaning there would be no changes in population or employment over the three-county area covered by Eglin AFB.

Because all training activities would occur on the Eglin range in areas that are closed to the public, there are no restricted access issues for Alternative 1.

4.1.3 No-Action Alternative

The No-Action Alternative represents the current baseline of ongoing military activities conducted on Eglin AFB. These baseline activities have positive socioeconomic effects on Okaloosa, Santa Rosa, and Walton counties.

4.2 NOISE

The word "metric" is used to describe a standard of measurement. As used in environmental noise analysis, there are many different types of noise metrics. Each metric has a different physical meaning or interpretation and each metric was developed by researchers attempting to represent the effects of environmental noise.

Two metrics are used to assess potential C-weighted noise impacts resulting from the detonation of high explosives in this EA. The first is Sound Pressure Level (SPL) and the second involves considerations of time-averaged noise levels.

Sound Pressure Levels

The SPL metric is the metric used for the direct assessment of noise impacts resulting from the detonation of high explosives. This is the actual noise level, in decibels, and is identified as dBP. This metric reflects the actual sound pressure associated with the event.

Time-Averaged Noise Levels

The Time-Averaged Noise Levels metric is employed to further assess noise impacts. Where applicable, this is the recommended metric for assessing community response to intrusive noise, and its use is endorsed by federal agencies such as the National Research Council, Committee on Hearing, Bioacoustics, and Biomechanics (CHABA), the Federal Interagency Committee on Noise (FICON), the Federal Interagency Committee on Urban Noise (FICUN), and the scientific community. The time-averaged noise level that is considered is the Day-Night Average Noise Level associated with C-weighted noise (L_{Cdn}).

Day-Night Average Sound Level

The L_{Cdn} metric sums the individual noise events and averages the resulting level over a specified length of time. Thus, it is a composite metric representing the maximum noise levels, the duration of the events, the number of events that occur, and the time of day during which they occur. This metric adds 10 dB to those events that occur between 10:00 P.M. and 7:00 A.M. to account for the increased intrusiveness of noise events that occur at night when ambient noise levels are normally lower than during the daytime. This cumulative metric does not represent the variations in the sound level heard. Nevertheless, it does provide an excellent measure for comparing environmental noise exposures when there are multiple noise events to be considered.

For some specific applications associated with A-weighted noise, this metric is further refined as described below.

Onset-Rate Adjusted Monthly Day-Night Average Sound Level

To account for the random and often sporadic nature of military flight training activities in military training airspace, some of the computer programs developed by the Air Force to calculate noise levels created by these activities base their calculations on a monthly, rather than a daily, period. Additionally, to consider some of the unique aspects of noise created by low altitude, high-speed flight of military aircraft, up to 11 dBA may be added to the calculated noise

levels to account for the rapid onset rate of the noise. This sound measurement metric is termed the Onset-Rate Adjusted Monthly Day-Night Average Sound Level, L_{dnmr}. Disregarding the onset-rate adjustment for a moment, it should be noted that arithmetically, calculations of L_{dnmr} will yield the same result as calculations of L_{dn}, as long as the numbers of sound events, or aircraft operations considered, are normalized to monthly, as opposed to daily, rates.

L_{dnmr} is the metric used in this EA to describe aircraft noise during the exercise.

Explosive Noise Assessment

Explosions rapidly release large amounts of energy within a confined space. This almost instantaneous release of energy creates extremely high temperatures and pressures that expand rapidly from the point of detonation. This creates significant overpressures, and the expanding movement of the blast front is accompanied by very high winds. In the immediate vicinity of the explosion, overpressures can exceed 200 pounds per square inch (psi), which is more than 13 times normal atmospheric pressure. Similarly, winds may reach hundreds of miles per hour. As distances increase from the point of detonation, these phenomena decrease to levels that create less risk to structures, persons, animals, and plant life.

Although numerous thresholds could be established with regard to exposure to these adverse environments, the three criteria discussed below are used in this document to assess anticipated impacts resulting from this specific test program. The first two criteria are discrete and apply to every explosion. The third considers time-averaged cumulative noise exposure.

Federal health and safety standards prescribe that a person should never be exposed to impulsive sounds greater than 140 dBP without ear protection [29 CFR Ch. XVII § 1926.52(e)]. Therefore, the extent of exposure to this acoustic level is one criterion for assessing impacts to wildlife from Navy Pre-Deployment Training.

The second criterion designates an operational goal, limiting individual peak sound pressure levels to 115 dBP at the reservation boundary. This level is based on noise management practices used by the U.S. Army. For impulse noise less than 115 dBP, all testing and training programs would continue. If a testing or training program produced noise of >115 dBP outside base boundaries, then only critical programs would continue. Non-critical programs would be postponed (U.S. Army, 2001).

The third assessment criterion considers the off-installation population exposure to elevated noise levels. Based on numerous social surveys and other studies, the federal government and the scientific community have developed guidelines for land use compatibility under various levels of Day-Night Average Noise Level exposure. At a Day-Night Average impulsive noise level of L_{Cdn} 62, all land uses are compatible, and only a relatively small percentage of the population (approximately 15 percent or less) would be expected to be "highly annoyed" by the noise (CHABA, 1981). However, most land uses are noncompatible at exposure to L_{Cdn} 70, and a relatively significant portion of the population (approximately 39 to 40 percent) would be expected to be "highly annoyed" (CHABA, 1981).

4.2.1 Proposed Action

The Proposed Action would include large- and small-scale exercises conducted by Naval aviation forces. In the large-scale GOMEX COMPTUEX, approximately 1,100 fixed- and rotary-wing aircraft sorties would be flown, and approximately 264 Mk-80 series high-explosive bombs as well as other types of munitions would be delivered on Eglin AFB ranges. In the smaller scale JTFEX, approximately 24 high-explosive bombs would be expended.

4.2.1.1 Impacts from Aviation Operations

Using the Air Force's program MR_NMAP, which is specifically designed to consider the unique aspects of flight within these elements of military training airspace, the maximum noise levels associated with use of the airspace were calculated. These levels are shown in terms of Onset-Rate Adjusted Monthly Day-Night Average Sound Levels (L_{dnmr}). The calculated noise levels in these airspace elements under baseline conditions are presented in Chapter 3, Table 3-2. Aircraft noise for the COMPTUEX is presented in Table 4-1. The restricted airspace blocks (R-2914 and R-2915) encompass several test areas over which sorties would be flown. Test Area C-52N, proposed for a greater percentage of sorties, is shown separately to provide an upper bound to the aircraft noise over a given test area. Noise over other individual test areas is assumed to be less than the values shown for C-52N in the table below.

Table 4-1. Aircraft Noise Levels

Event	Noise Levels (L_{dnmr}) for Indicated Airspace		
	R-2914	R-2915	C-52N
Integrated Strike	28.7	28.7	
Close Air Support	58.5	58.5	
CSAR	25.9	25.9	
Unit Level Bombing			57.0
Helo Unit Level	24.9	24.9	
HS/HSL Unit Level	18.9	18.9	
Total	**58.5**	**58.5**	**61.8**

Noise levels associated with aircraft use of the military training airspace are not excessive. While individual aircraft may be heard during ingress and/or egress from the range, noise levels would be less than 62 dB and therefore, would not be expected to create impacts on the public.

4.2.1.2 Impacts from Munitions Use

Impulsive noise is common to the Eglin environment. Test Area C-52N, Test Area A-77, and Test Area C-72 are actively used as impact areas for high-explosive munitions as well as gunnery and small arms.

Since munitions use constitutes impulsive noise and uses the C-weighted scale for assessment, it is not appropriate to add values from the munitions use assessment to values based on the A-weighted scale used to assess aircraft noise. Therefore, these impacts are addressed independently.

For impulsive noise, the noise analysis focuses on determining the area potentially impacted at the threshold levels identified above for single and multiple detonations of the TNT-equivalent of 236 pounds and 534 pounds net explosive weight occurring during a typical exercise day. The Noise Assessment and Prediction System (NAPS) was used to model the events (Smith et al., 1991). NAPS provides an estimate of the uniform surface peak noise intensity in all directions around a blast source. The model also has the capability to incorporate meteorological conditions into the blast sound propagation. The model calculates acoustic intensity estimates by generating acoustic ray traces over a sufficient range of azimuth and elevation angles to define the focusing and shadow regions in the area around the blast. Additionally, it considers the effects of spherical spreading, absorption, focusing, and interference resulting from multiple rays arriving at the same location.

In order to identify potential variables associated with specific meteorological conditions, the model was run under several conditions, two of which are discussed here in detail. Weather staff at Eglin provided meteorological data applicable to an average day.

The first time the model was run, the temperature and humidity were incorporated, but it did not consider the effects of winds. However, meteorological conditions do have significant effects on impulsive sound propagation. Therefore, to assess this sensitivity, the second time the model was run, it included the wind data, as well as a minor temperature inversion. It should be noted that these meteorological conditions are but one typical profile that could be encountered. They are included only to illustrate the effect of weather on noise propagation.

Figures 4-1 through 4-3 below graphically show the temperatures, wind directions, and wind speeds as a function of increasing altitude above ground level. Figure 4-1 shows that as the altitude increases from the ground to 3,000 meters, the temperature decreases from 21 degrees Celsius (ºC) to 4 ºC.

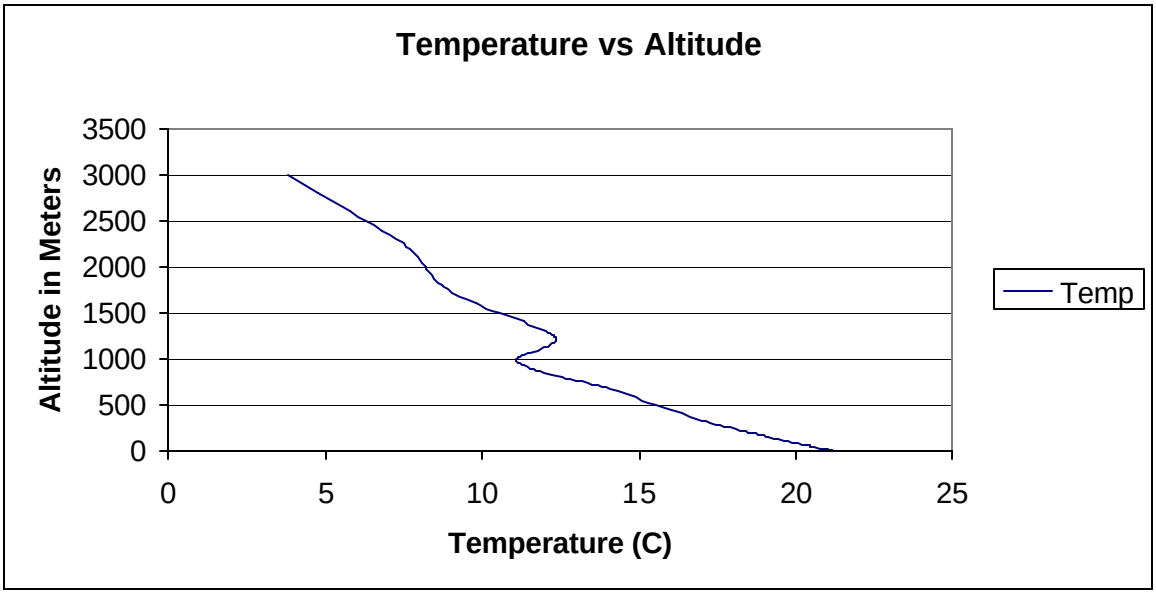

Figure 4-1. Temperature versus Altitude

Figure 4-2 shows that there is a temperature inversion between 1,000 and 1,250 meters in altitude, and at the same level, winds abruptly shift from the east-northeast to the west-northwest.

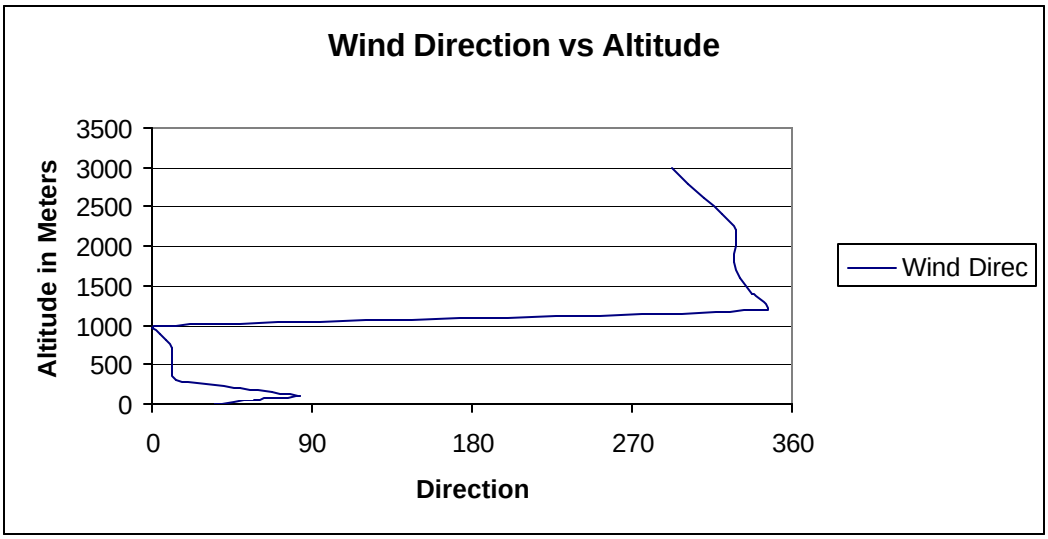

Figure 4-2. Wind Direction versus Altitude, Typical Spring Day.

Figure 4-3 shows that winds are blowing from the northwest, through north, to the northeast.

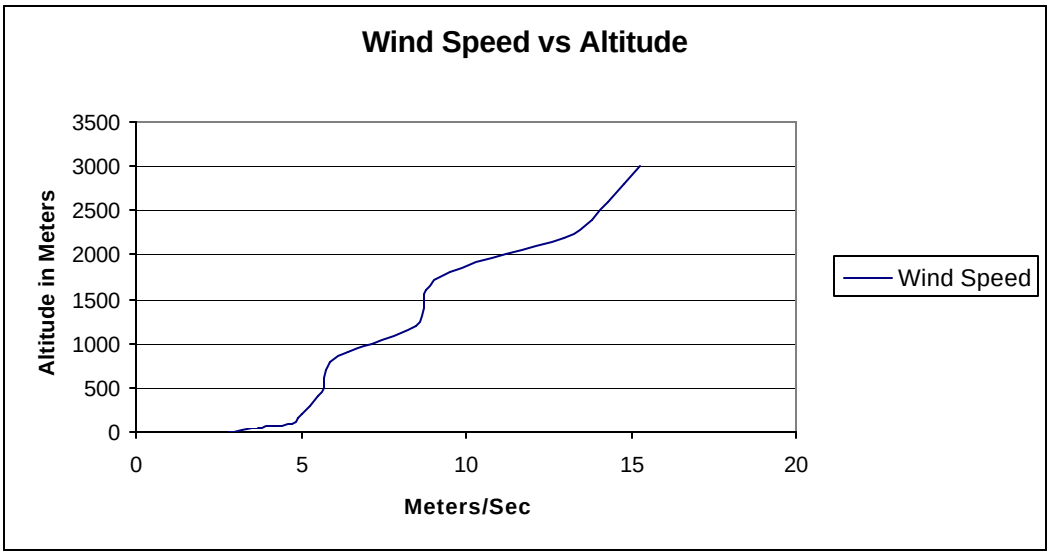

Figure 4-3. Wind Speed versus Altitude

As identified above, three quantitative criteria were used to assess impacts. The first was an SPL of 140 dBP. This value is a discrete event and is repeated with every detonation. Therefore, information on this value is provided directly by the model, and its extent is direct output from the model. Similarly, the extent of 115 dBP is also a direct model output.

Conversely, since Day-Night Average Sound Levels are not a direct output from the model, they must be developed. This process is briefly described below.

The basic equation for the calculation of L_{Cdn} is:

$$L_{Cdn} = CSEL + (10Log_{10}(N_D + 10N_N)) - 49.4$$

Where: CSEL = C-weighted Sound Exposure Level for a single event
N_D = Number of events occurring between 0700 and 2200 hours
N_N = Number of events occurring between 2201 and 0659 hours
49.4 = 10 Log_{10} (86,400). This is the number of seconds in 24-hours

The relationship between pressure in dBP (which is the model's output metric) and CSEL is:

$$CSEL \cong dBP - 25$$

Therefore, by substituting and combining terms, a dBP-dependent equation may be developed as:

$$L_{Cdn} \cong dBP + (10Log_{10}(N_D + 10N_N)) - 74.4$$

Additionally, by using the desired assessment criteria in terms of L_{Cdn} value, the equation can be solved for the dBP value required. For analysis the detonation of high-explosive bombs was distributed equally over the exercise period between Mk-82s/GBU-12s, Mk-83/GBU-16s/GBU-32s and Mk-84s/GBU-31s, which would equate to approximately 30 bombs per day. The daily detonation of 10 each Mk-82s, Mk-83s and Mk-84s would result in L_{Cdn} 62 out to a maximum distance of 2.3 miles. Distances from the point of detonation to these dBP levels were determined for every 10 degrees of azimuth, or directional bearing from the target.

Noise Impacts Under No-Wind Conditions

Potential impacts are considered both inside (on the installation) and outside the Eglin Reservation boundary (off the installation). To determine off-installation impacts, graphic plots of NAPS-modeled noise contours were projected onto the target locations (Figure 4-4).

Initial modeling of the proposal was accomplished without considering winds. This produces symmetrical noise contours around the point of detonation. The distances from that point to the levels of concern are shown in Table 4-2.

Table 4-2. Noise Contours without Winds

Noise Level (dBP)	Average Sound Level	Distance (In Miles)
140 (Mk-84/GBU-31)	N/A	0.70
140 (Mk-83/GBU-16/GBU-32)	N/A	0.57
140 (Mk-82/GBU-12)	N/A	0.46
115 (Mk-84/GBU-31)	N/A	5.4
115 (Mk-83/GBU-16/GBU-32)	N/A	4.4
115 (Mk-82/GBU-12)	N/A	3.5
N/A	L_{Cdn} 62	2.3

Average Noise

Since the nearest off-installation point is 5.4 miles away (from TA C-52N to Bluewater Bay in Niceville), under these conditions minimal impacts would be expected to result from the

Proposed Action. Daily average noise contours of detonations under this scenario would not exceed the average sound level of L_{Cdn} 62 off the reservation, extending out to approximately 2.3 miles. Thus, for the 9-day duration of the COMPTUEX, average noise levels from explosive ordnance would not be significant from detonations at TA C-52N and TA C-72. Up to four maverick missiles would be expended on TA C-72 over the 9-day period, but with a lower net explosive weight (i.e., 86 lb) than the Mk-80 series of bombs, their contribution to noise is negligible.

At A-77 the L_{Cdn} 62 noise contour extends a few hundred feet off the reservation into the Holley-Navarre area. According to 2000 Census block data, approximately 30 people would be would be exposed to daily average noise levels above L_{Cdn} 62 if Mk-83s are detonated on A-77. Since the L_{Cdn} 62 noise level threshold is by definition an annual measure, the increased daily noise at A-77 over the 9-day duration of the COMPTUEX would have to occur every day for a year in order to result in a significant increase in noise to the community.

JTFEX explosive ordnance expenditures are fewer than the COMPTUEX and would produce lower average noise effects to the community. Lower net explosive weight munitions and fewer munitions would be expended onto TA B-82; thus noise at this test area would not be significant.

Single-Event Noise

Single event noise of 115 dBP from detonations at TA C-52N and TA C-72 extends out to the reservation boundary from Mk-83 detonations, the largest munition that would be expended. This level of noise is one that would be expected to annoy approximately 15 percent of the population. Noise contours in Figure 4-4 represent modeling under a no-winds, no-temperature inversions scenario. Under these favorable weather conditions, noise impacts to the community would be minimal.

The nearest off-installation point to TA A-77 is the Holley-Navarre area. Under favorable weather conditions, single-event noise >115 dBP would extend approximately 1.5 miles off the reservation, potentially affecting up to 3500 people as determined from U.S. Census data in Eglin GIS files. Of these 3500, approximately 15 percent or 525 would potentially be annoyed by the noise based on annoyance criteria used by the U.S. Army (U.S. Army, 2001). Structures (i.e., buildings, houses) would dampen noise by approximately 20 dB such that further reductions in noise effects would occur. All land uses would remain compatible. For this analysis, an average of 30 Mk-80 series bombs per day was considered for Test Area A-77. However, TA A-77 is not a primary target area for Mk-80 series bombs and may not be used for any bombing events. C-52N would remain the primary target area with A-77 being used only if weather conditions prohibit the use of C-52N. Under favorable weather conditions, noise of 115 dBP from the largest Mk-80 series bombs, the GBU-31/Mk-84, would barely extend off the reservation north of TA C-72 and south of TA C-52N (Figure 4-4). While a small percentage of the population living near the reservation boundary may be annoyed, these noise events would only occur a few days per year. Thus, single-event noise would not be significant.

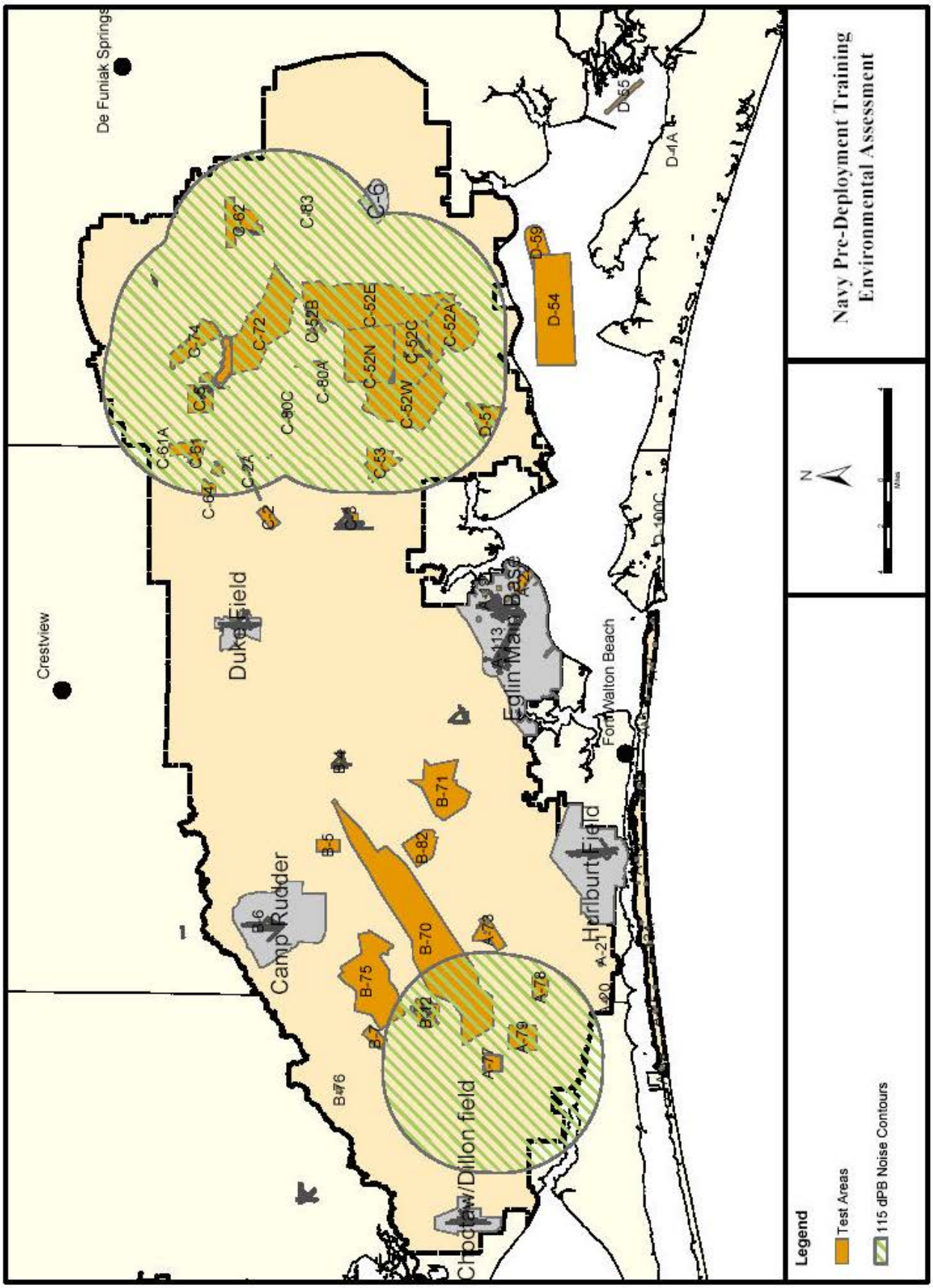

Figure 4-4. Single-Event Noise Contours Under Favorable Weather Conditions

Noise Impacts with Consideration of Winds and Temperature Inversions

To consider the effects of meteorological conditions on sound propagation, the NAPS model was run using the temperature, wind directions, and wind speeds identified above in Figures 4-1 through 4-3. Winds affect the propagation of the sound, producing asymmetrical contours. The direction and distance of the noise contours is compared with the distance to the range boundary for a range of azimuths in Figures 4-5 through 4-10. Because the potential for possible significant impacts exists, explosive bombing operations would not occur under these conditions.

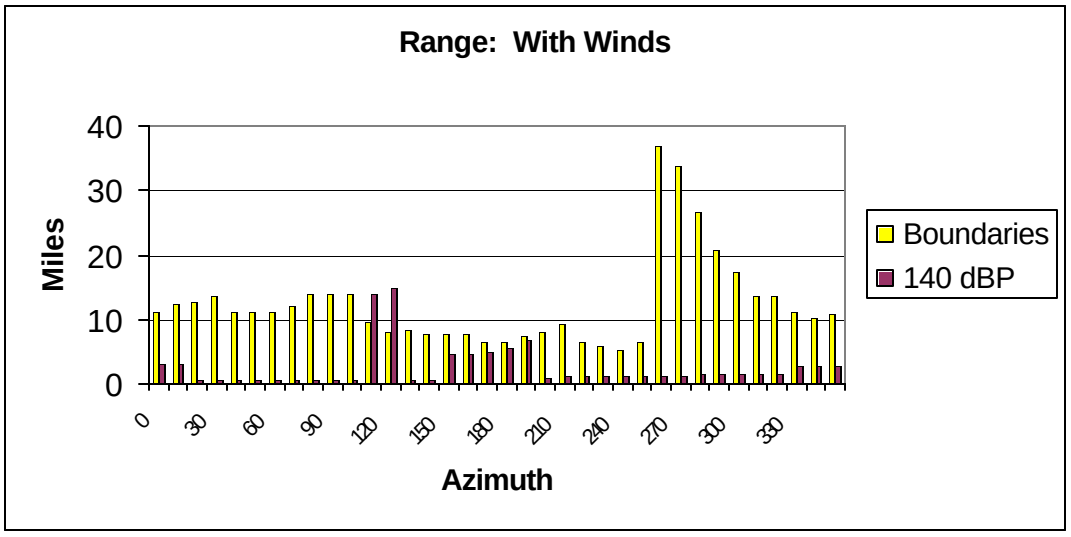

Figure 4-5. Mk-83 140 dBP Contours with Northwest through Northeast Winds

As shown above in Figure 4-5, for the Mk-83 at 110° and 120° azimuth from the point of detonation, these contours would extend off the installation.

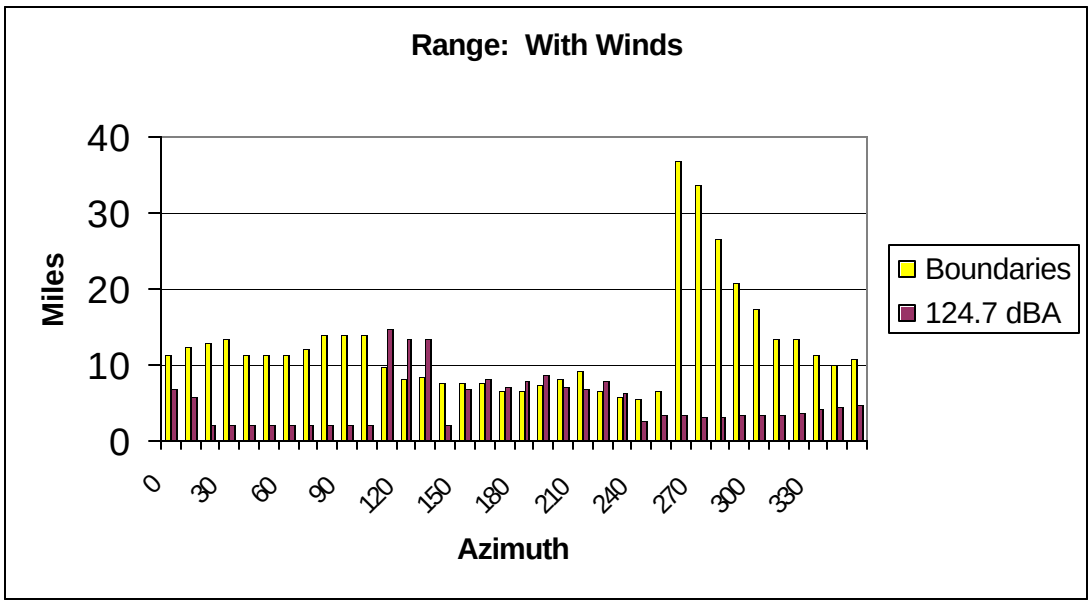

Figure 4-6. Mk-83 62 L_{Cdn} Contours with Northwest through Northeast Winds

As above in Figure 4-6, due to the effects of the northwest through northeast winds, elevated noise levels spread off the installation to the southeast through the southwest.

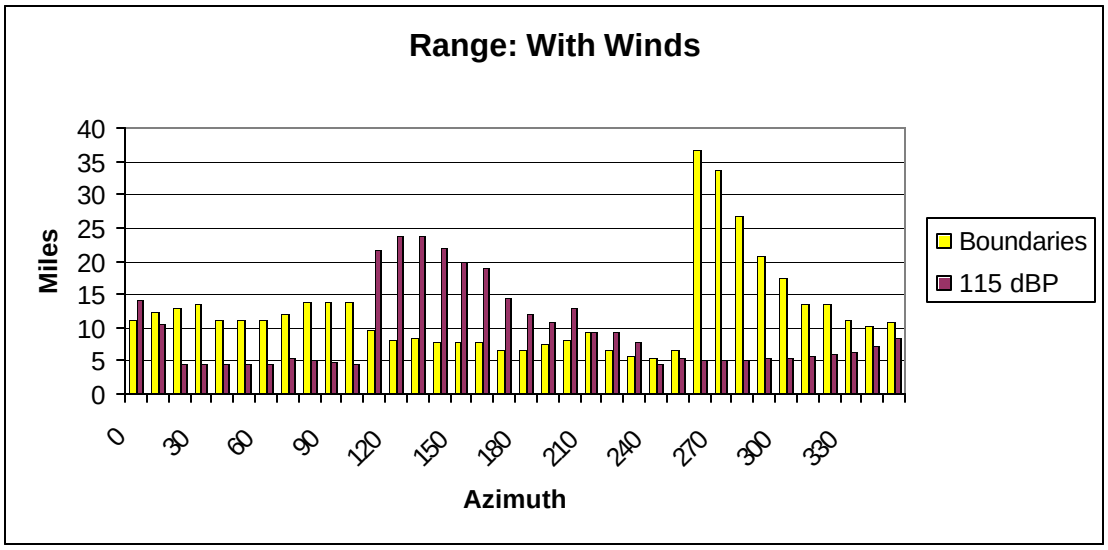

Figure 4-7. Mk-83 115 dBP Contours with Northwest through Northeast Winds

Similar effects result for the 115-dBP contours for the same reason (Figure 4-7).

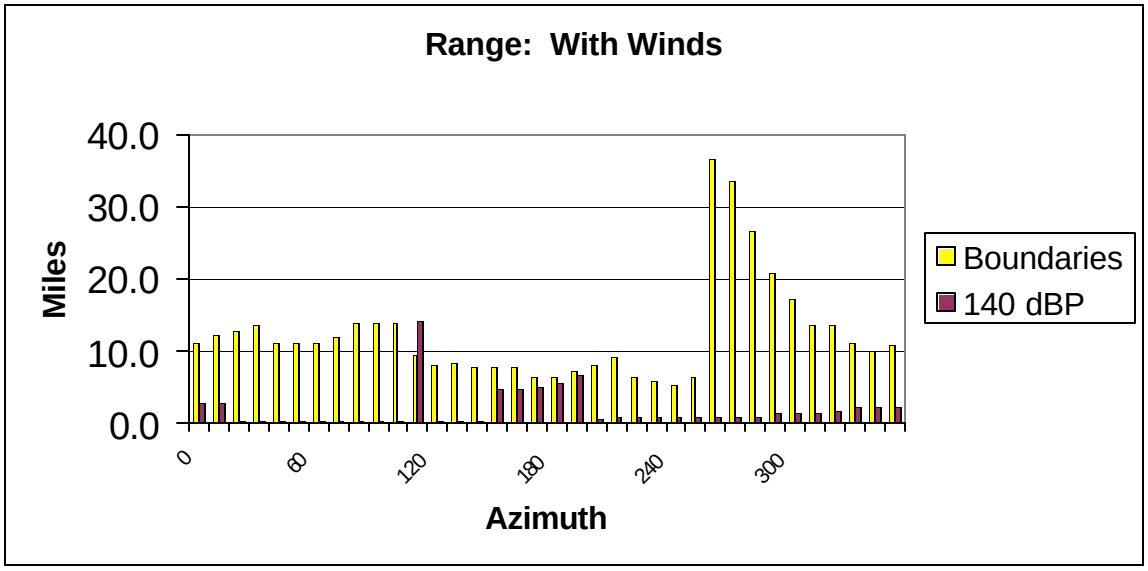

Figure 4-8. Mk-82 140 dBP Contours with Northwest through Northeast Winds

The Mk-82 ordnance, with less net explosive weight, exhibits similar effects, but the severity is lessened. The 140-dBP contour only extends off the installation at one location, along the 110^{o} azimuth (Figure 4-8).

As shown in Figure 4-9, the combined effects of the Mk-83 and Mk-82 ordnance further extend the L_{Cdn} 62 off the installation.

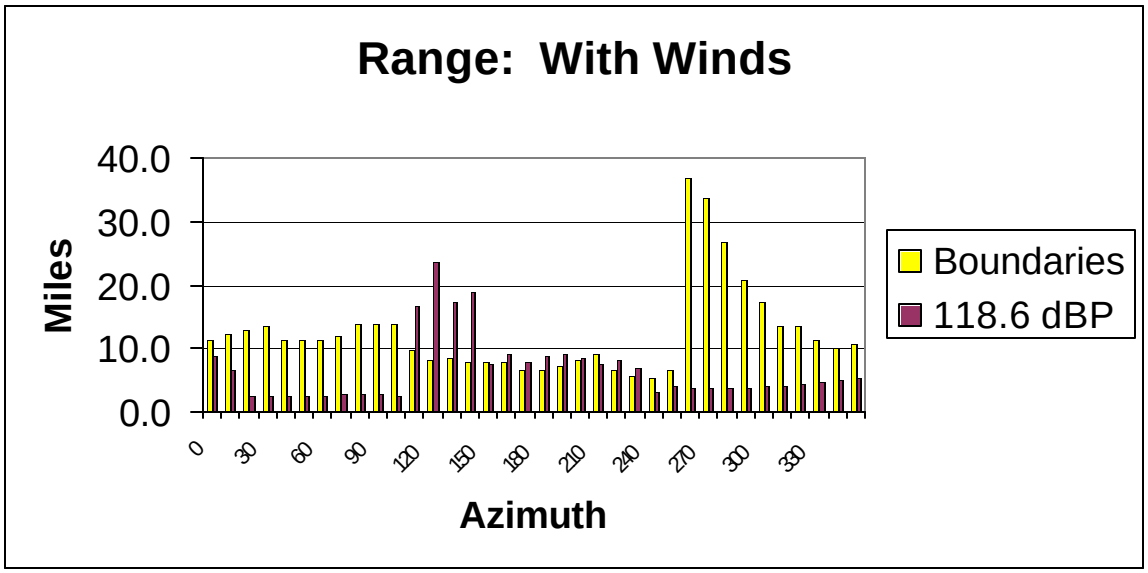

Figure 4-9. Mk-82 Extended 62 L_{Cdn} Contours with Northwest through Northeast Winds

As shown, during a COMPTUEX exercise, the noise levels of concern extend off the installation into numerous locales (Figure 4-10).

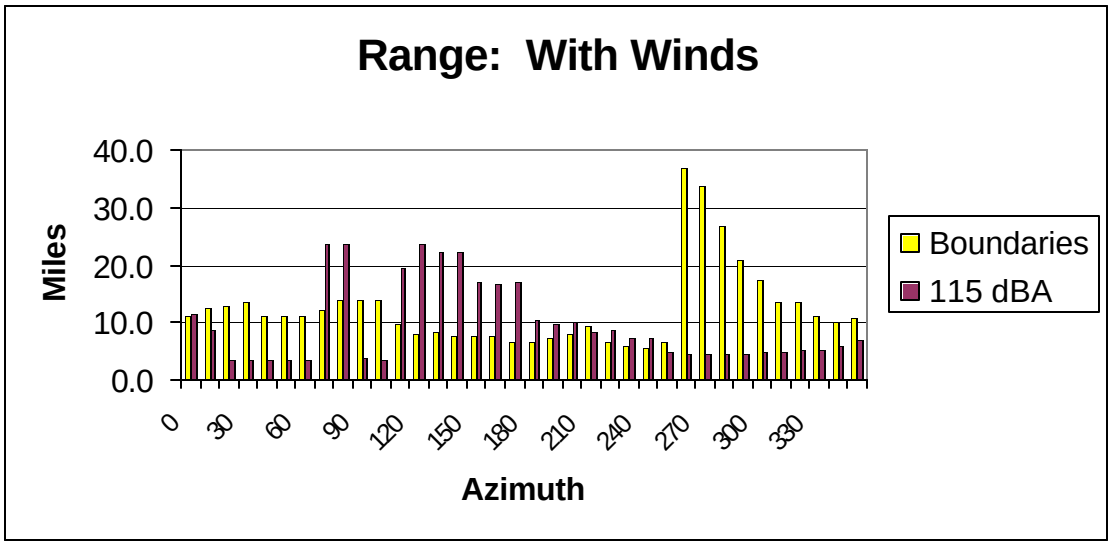

Figure 4-10. Mk-82 115 dBP Contours with Easterly to Southeasterly Winds

When these levels of operations are considered, modeling of noise under adverse weather conditions shows that there is a reasonable potential to impact human health and safety at some locations off the installation. Because of this, when such conditions are present, explosive bombing operations would not occur or would be directed to targets or test areas far enough from the reservation boundary to alleviate adverse noise impacts. To determine the degree to which noise would leave the reservation, modeling of weather conditions prior to explosive bomb use is required. TA A-77 is not a primary target area for Mk-80 series bombs and may not actually be used for any bombing events. TA C-52N would remain the primary target area with TA A-77 being used only if weather conditions prohibit the use of C-52N.

When the graphed data above (Figure 4-10) are considered, those data points indicate that under more favorable wind conditions (i.e., easterly to southeasterly), many of the adverse effects identified would be significantly reduced, or entirely eliminated. Use of the range under those meteorological conditions takes advantage of the extensive land area of the installation west and northwest of the points of detonation, which provides an additional buffer.

During the conduct of a JTFEX, the discrete, individual weapons effects described above would be unchanged. However, the elevated Day-Night Average Noise Levels would be somewhat minimized due to the lower average daily use of high-explosive ordnance. Considering this level of use, the 62 L_{Cdn} contour would conform to SPLs of 130.4 for the Mk-83s, and less than 124.4 for the Mk-82s.

Noise modeling using real-time, day-of or near future weather forecast conditions is required to understand potential noise impacts and adjust test area use as necessary.

4.2.1.3 Proposed Action Noise Summary

Aircraft noise would originate from sorties flown in restricted airspace. This airspace is already used on a daily basis by Eglin AFB for similar activities. While the number of COMPTUEX/JTFEX daily sorties would be somewhat higher than what is usually flown, modeling has shown that the contribution to noise would not be significant.

Noise from explosive ordnance would originate from bombs dropped on selected Eglin AFB test areas. Bomb noise over the 9-day COMPTUEX would not significantly increase average annual noise levels off the reservation. On a given day, bomb noise would potentially annoy a small number of the population according to guidelines for single event noise used by the U.S. Army (U.S. Army, 2001), but these effects would not be significant.

Weather can affect the degree to which noise is carried off the reservation such that under certain wind conditions there is a possibility of significant noise effects from most large detonations that occur on Eglin AFB, including those that would occur with the COMPTUEX/JTFEX. Noise modeling conducted the day of training can help determine whether such noise effects would occur so that explosive bomb training can be postponed or a different test area selected. For the Proposed Action, the NAPS noise model would be used daily to estimate potential noise effects from COMPTUEX/JTFEX bombing and would aid decision makers in minimizing these effects to the community.

4.2.2 Alternative 1

The noise intensity associated with the level of activity in this alternative would remain the same as that analyzed for the Proposed Action. However, because the duration of the event would only be five days, rather than the full 9-day period of the Proposed Action, the impacts would be lessened. Because there are no significant noise impacts associated with the Proposed Action, and this alternative would decrease the number of days without increasing the intensity, the noise impacts for this alternative are not significant.

Daily noise modeling would be required for this alternative to determine if weather conditions would cause significant levels of noise to extend off the reservation.

4.2.3 No-Action Alternative

There would be no new/increased noise impacts under this alternative, and noise-generating testing and training activities would continue at their current level.

4.3 SAFETY

The primary safety issue concerns the health and welfare of military personnel training within areas where UXO may occur. Standard operating procedures are in place to address safety hazards to personnel; thus, these impacts can be minimized to the extent practicable. No safety issues to the public are anticipated since the public would not be allowed within the training areas. Safety footprints would be developed by the Eglin Safety Office that would identify the areas within which all munition fragments and expended rounds would be contained (U.S. Air Force, 2004). During COMPTUEX/JTFEX training exercises, range roads, test areas, and Eglin interstitial areas would be closed as necessary to ensure the safety of the public. AAC safety procedures would be followed while on the Eglin Reservation.

4.3.1 Proposed Action

4.3.1.1 Impacts from Aviation Operations

COMPTUEX/JTFEX aviation operations would occur in U.S. Air Force-controlled airspace. No public safety impacts are anticipated.

Bird-aircraft strikes and the hazards they present are a safety concern that the Air Force addresses through the Bird Aircraft Strike Hazard (BASH) Reduction Program. The goals of the program are to reduce bird strikes through awareness, bird control, bird avoidance, and aircraft design. The Air Force uses a bird avoidance model, which incorporates past strike information and bird migration and flight patterns to minimize the potential for bird strikes, which can result in loss of aircraft or human life. More than 95 percent of bird-aircraft strikes occur at altitudes below 3,000 feet above ground level (AGL), and most of these occur near airfields (U.S. Air Force, 2001a). COMPTUEX/JTFEX aviation operations would not differ from typical ongoing aviation operations in terms of routes or numbers of aircraft, and an increase in bird strikes is not anticipated.

4.3.1.2 Impacts from Munitions Use

Wildfire events would likely increase from munitions use. Once a fire is started, it can spread to adjacent forested buffer zones. The fires are either extinguished or allowed to burn under control if they may have any beneficial effects. Wildfires have decreased on Eglin since 1986. The numbers of wildfires have decreased because of fire management practices such as prescribed burns, which decrease fuel availability for wildfires. On an average annual basis between 1990 and 2000, about 109 wildfires occurred each year on or near the Eglin Reservation, burning an average of approximately 8,300 acres per year (U.S. Air Force, 2001). Potential safety impacts associated with wildfires pertain to the potential for smoke to impede roadways and safety concerns for the public and for military personnel. Eglin utilizes a Wildfire Hazard Index that

minimizes or prohibits the use of pyrotechnics and munitions during conditions with a high wildfire potential (high winds and/or low humidity or drought). By adhering to these operating procedures, there would be no significant impacts from munitions-related fires.

4.3.2 Alternative 1

Under this alternative a 5-day COMPTUEX would be conducted as opposed to a 9-day COMPTUEX. There would be no significant safety impacts due to the existence of the same safety-based programs discussed under the Proposed Action, namely the BASH program and the observance of an Eglin's Wildfire Hazard Index.

4.3.3 No-Action Alternative

Baseline military missions would continue to be conducted, observing all applicable safety programs. No significant safety impacts would occur.

4.4 WETLANDS

Potential impacts to wetlands are discussed in Section 4.10, Sensitive Habitats.

4.5 FLOODPLAINS AND COASTAL ZONE

Executive Order 11988, Floodplain Management, requires examination of actions involving construction (i.e., buildings, roads) within a floodplain for the potential to impact drainage patterns within the floodplain or for the potential for people or structures to be impacted by flooding in order to minimize or prevent loss of life and property.

4.5.1 Proposed Action

Coastal Zone Consistency Determination

With consideration of potential impacts to wetlands and floodplains, the Proposed Action does not involve any new construction and would utilize existing targets that are currently used for explosive and nonexplosive ordnance testing and training. Therefore, the Proposed Action is consistent with the Coastal Zone Management Program of the state of Florida (Table 4-3). No changes to the floodplain would result, and the action does not occur in a floodplain or wetland. As a result, there would be no adverse impacts to floodplains or wetlands and no permits would be required.

4.5.1.1 Impacts from Aviation Operations

Aviation operations would have no effect on floodplains.

Table 4-3. Proposed Action Consistency with Florida Coastal Management Program

FCMP Statute	FCMP Chapter Resource	Proposed Action Consistency Statement
Chapter 161	Coastal Construction	No construction would occur.
Chapter 163	Local Government	Coordination with local governments would be accomplished.
Chapter 186	State and Regional Planning	The EA public review process would allow state and regional planners an opportunity to provide comments.
Chapter 252	Disaster Preparedness	Hurricane season would be avoided and no interference with disaster preparation would occur.
Chapter 253	State Lands	State lands would not be affected.
Chapter 258	Outdoor Recreation	Effects on outdoor recreation and tourism, addressed in the EA, would not be significant.
Chapter 259	Land Conservation Action of 1972	The status of conservation lands would not change.
Chapter 260	Recreational Trails System	The Florida Trail and Yellow River Canoe Trail are located within the Affected Environment but would not be significantly impacted.
Chapter 267	Historic Preservation	Cultural resources would not be affected.
Chapter 288	Commercial Development	Commercial development would not be affected since the action occurs on federal property.
Chapters 334 and 339	Public Transportation	Transportation would not be affected.
Chapters 370 and 372	Living Resources	Living resources would not be significantly impacted.
Chapter 373	Water Resources	Water resources would not be affected. No permits are required.
Chapter 375	Outdoor Recreation, Land Acquisition	Impacts to outdoor recreation, discussed as a restricted access issues in the EA, would not be significant. No land would be acquired.
Chapter 376	Pollutant Spill Prevention	Pollutant spill personnel and procedures would be in place to handle any such occurrence.
Chapter 377	Oil and Gas Production	Oil and gas production would not be affected.
Chapter 380	Land and Water Management	No changes to land and water management would result.
Chapter 381	Public Health	Public health issues of noise and safety, addressed in the EA, would not result in significant impacts.
Chapter 388	Mosquito Control	Mosquito control is not applicable to the Proposed Action.
Chapter 403	Sources of Water and Air	Water and air quality impacts would not be significant. Potable water sources would not be affected.
Chapter 582	Soil and Water Conservation	Soil and water conservation is not an issue. Other than ordnance expenditures, no ground-disturbing activities would occur, and no wastewater would be generated in the field.

4.5.1.2 Impacts from Munitions Use

Explosive and nonexplosive munitions would not be used within a floodplain. Wetland areas would be avoided where possible. Additional discussion on potential impacts to wetlands is provided in Section 4.10, Sensitive Habitats.

4.5.2 Alternative 1

This alternative would not take place within a floodplain. Thus, there are no impacts.

4.5.3 No-Action Alternative

Baseline activities would continue under this alternative. Floodplains and coastal zones would not be significantly impacted. Navy Pre-Deployment Training would not occur at Eglin AFB.

4.6 WATER QUALITY

Water quality is a measurement of the chemical and physical characteristics of a water mass that describes its suitability for specific uses. The surface water quality of rivers, streams, creeks, bayous, and bays in the range of influence is rated periodically by the state. In general, FDEP rated all the major river/stream mainstems (Yellow River, Turkey Creek, Rocky Creek, Turtle Creek, and Live Oak Creek) as fully meeting water quality standards (FDEP, 2002). Current water quality for Eglin streams and bays is good, but excess sedimentation is a problem for many water bodies on and around Eglin.

Analyses focus on potential changes to water quality parameters at the test areas where explosive ordnance operations would take place.

4.6.1 Proposed Action

4.6.1.1 Impacts from Aviation Operations

Aviation operations would not affect water quality.

4.6.1.2 Impacts from Munitions Use

Munitions use could potentially affect water quality through transport of munitions by-products to surface or ground waters, but amounts of by-products are anticipated to be minimal. Target areas are located away from surface waters. Thus significant impacts to water quality would not occur. More analysis on the transport of components from munitions use is provided in Section 4.8, Hazardous Materials/Solid Waste.

4.6.2 Alternative 1

The conduct of COMPTUEX training over a 5-day period as opposed to a 9-day period would have a lower potential to affect surface and ground waters. Target areas would be the same but the number of bombs potentially dropped would be fewer than the Proposed Action. Thus, significant impacts to water quality would not occur.

4.6.3 No-Action Alternative

Baseline activities would continue under the No-Action Alternative. Pre-Deployment Training would not be conducted at Eglin AFB. Significant impacts to water quality would not occur under this alternative.

4.7 AIR QUALITY

Project-generated air emissions were analyzed to determine if the following would occur.

- There would be a violation of a National Ambient Air Quality Standards (NAAQS).
- Emissions would contribute to an existing or projected air quality violation.
- Sensitive receptors would be exposed to substantial pollutant concentrations.
- There would be an increase of 10 percent or more in tri-county criteria pollutants emissions.
- Any significance criteria established by the Florida State Implementation Plan (SIP) would be exceeded.
- A permit to operate would be required.
- A change to the Title V permit would be required.

The primary emission sources associated with the Proposed Action are aircraft operations and the expenditure of explosive ordnance on the Eglin ranges. Because the emissions generated by the training exercises are considered temporary, analysis is limited to estimating the amount of combustive emissions emitted from mobile sources (aircraft) and fugitive emissions from the expenditure of explosive ordnance. Analysis of mobile and stationary sources during the exercise phases consists of quantifying the emissions and evaluating how those emissions would affect progress toward maintenance of the national and state ambient air quality standards. Under existing conditions, the ambient air quality in Santa Rosa, Okaloosa, and Walton counties are classified as attainment for all criteria pollutants.

Fundamental steps in the evaluation of environmental effects on air quality are to identify the sources of the effect, identify the quantitative measures for evaluating the extent of the effect, and develop formulas for computing and assessing those measures. These formulations are based on the types of data that are generally available or can easily be collected for the Proposed Action.

Florida has developed a SIP as required by Section 110 of the Clean Air Act (CAA) to provide for the implementation, maintenance, and enforcement of the NAAQS for each air quality region within the state. The SIP is the primary vehicle used by U.S. Environmental Protection Agency (USEPA) for enforcement of federal air pollution legislation.

Section 176(c) of the CAA provides the basis for the relationship between the SIP and federal projects. It states that no federal agency shall support or approve any activity or action that does not conform to an implementation plan after the plan has been approved or promulgated under Section 110. This means that federally supported or funded activities would not: 1) cause or contribute to any new violation of any air quality standard, 2) increase the frequency or severity of any existing violation of any standard, or 3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. In accordance with Section 176(c), USEPA promulgated the General Conformity Rule that is codified as 40 CFR 51, Subpart W. The provisions of this rule apply to state review of all federal general conformity

determinations submitted to the state pursuant to 40 CFR 51, Subpart W, and incorporated by reference at Rule 62-204.800, Florida Administrative Code. The Conformity Rule only affects federal actions occurring in nonattainment and maintenance areas. Since Eglin AFB is located in an attainment area, a conformity determination is not required.

For impact analysis, the estimated air emissions from COMPTUEX training exercises are compared to the summation of the Santa Rosa, Okaloosa, and Walton Counties' 2000 emission inventories. Potential impacts to air quality were then identified as the total emissions of any pollutant that equals 10 percent or more of the combined pollutant emissions for that specific pollutant. The 10 percent criteria approach was used in the General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas. However, for impacts screening in this analysis, a more restrictive criteria than required in the General Conformity Rule was used. Rather than comparing emissions from exercise activities to regional inventories (as required in the General Conformity Rule), emissions were compared to that of the three counties that encompass the Eglin Reservation (a smaller area).

4.7.1 Proposed Action

Potential air quality impacts were estimated using USEPA Open Burn/Open Detonation emission factors for various bomb detonation by-products (Mitchell and Suggs, 1998). Table 4-4 lists chemical by-products in the expected airborne amounts, which are derived by multiplying the number of munitions by the amount of explosive each contains by the applicable emission factor. Overall, release of these chemical constituents is not significant. Because there is a wide dispersal area, there would be no hazardous concentrations of pollutants. Criteria pollutants would not exceed 10 percent of county levels (Table 4-5).

4.7.1.1 Impacts from Aviation Operations

Combustive emissions from Navy aircraft would be generated during aviation operations in support of the different events of the COMPTUEX/JTFEX training exercises.

Eglin monthly aircraft sorties averaged 1,573 in calendar year 2001 (CY01) or approximately 19,000 sorties over the course of the year (U.S. Air Force, 2002b). The proposed COMPTUEX would involve up to approximately 890 aircraft sorties over a 9-day period twice yearly which is approximately 9 percent of the total sorties flown at Eglin. In CY01, Eglin baseline aircraft emissions contributed only 3 percent each to carbon monoxide, nitrogen oxides, and volatile organic carbons, and less than that for sulfur oxides, hazardous air pollutants, and particulate matter of all Eglin mobile sources. Based on the number of sorties that would occur under the COMPTUEX/JTFEX, aircraft emissions during the Proposed Action would not significantly increase Eglin mobile source pollutants, nor exceed 10 percent of county emissions.

Table 4-4. Criteria Pollutants Released During a COMPTUEX Event

Ordnance/Munition	Explosive Bombs		Nonexplosive Bombs				Missiles	Small Arms				TOTAL
	Mk82	Mk83	Mk82 GBU-12	Mk83 GBU-16	Mk-76	LGTR	Hellfire	20 mm TP	5.56 mm	.50 CAL	7.62 mm	EMISSIONS (LB)
Number of Rounds/ Ordnance Utilized	**132**	**132**	**160**	**160**	**1000**	**128**	**1**	**25000**	**3000**	**50000**	**50000**	
Net Explosive Weight	**192**	**424**	**0.28**	**0.28**	**0.0**	**0.0**	**14.6**	**0.08**	**0.004**	**0.034**	**0.0034**	
Primary Toxic Release Inventory (TRI) Chemical Released to Air (lbs)												
1,3-Butadiene	0.02	0.17	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	**0.24**
Acetaldehyde	0.05	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.18**
Ammonia	0.03	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.15**
Benzene	0.14	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.04**
Chromium (III) compounds	1.67	1.83	0.00	0.00	146.00	0.00	0.00	0.54	0.00	0.00	0.00	**150.03**
Ethane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Ethylbenzene	0.06	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.29**
Ethylene	0.56	3.99	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	**4.58**
Formaldehyde	0.05	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.18**
Hydrazine	0.10	0.25	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	**0.37**
Hydrogen cyanide	0.03	0.12	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	**0.17**
Lead compounds (inorganic)	0.00	0.00	0.00	0.00	0.06	0.00	0.00	1.73	15.93	596.00	140.08	**753.80**
Molybdenum trioxide	0.37	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.51**
n-Hexane	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.03	0.00	**0.14**
Nickel compounds	1.83	0.00	0.00	0.00	166.00	0.00	0.00	0.00	0.00	0.00	0.00	**167.83**
Nitric acid	0.08	0.25	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	**0.34**
Ozone	0.05	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.31**
Propylene (Propene)	0.05	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.18**
Toluene	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.42**
Criteria Pollutants Released to Air												
CO	162.76	359.43	0.29	0.29	0.00	0.00	0.09	12.84	0.08	10.92	1.09	**547.78**
NO_x	170.51	376.55	0.30	0.30	0.00	0.00	0.10	13.46	0.08	11.44	1.14	**573.88**
Total Hydrocarbon	21.80	48.13	0.04	0.04	0.00	0.00	0.01	1.72	0.01	1.46	0.15	**73.36**
PM_{10}	7603.20	16790.40	13.33	13.33	0.00	0.00	4.37	600.00	3.60	510.00	51.00	**25,589.24**

Table 4-5. Total Annual COMPTUEX/JTFEX Ordnance Emissions

Pollutant Emission Source	Pollutants (tons/year)				
	CO	**NO_X**	**PM_{10}**	**SO_X**	**VOCs**
Eglin AFB Stationary Emissions (CY2001)	72	96	101	11	109
Eglin AFB Mobile Source Emissions (CY2001)	16,935	80,823	6,143	12,672	5,752
Eglin AFB Totals	**17,007**	**80,919**	**6,244**	**12,683**	**5,861**
Santa Rosa County (CY2001)*	68,684	14,157	12,537	6,434	16,390
Okaloosa County (CY2001)*	71,952	8,296	7,363	698	11,135
Walton County Total Emissions (CY2001)*	21,368	3,475	3,508	230	3,573
Santa Rosa County (CY2001)*	68,684	14,157	12,537	6,434	16,390
County Totals	**162,004**	**25,928**	**23,408**	**7,362**	**31,098**
COMPTUEX/JTFEX Explosive Ordnance Emissions	0.27	0.29	1.3	N/A	0.04
Percent of Eglin Total Emissions	0.0016	0.0004	0.02	N/A	0.0007
Percent of County Total Emissions	0.00017	0.0011	0.0055	N/A	0.00013

Source: U.S. Air Force, 2002b; U.S. Air Force, 2003b
*Includes mobile sources

4.7.1.2 Impacts from Munitions Use

Combustive emissions from munitions would be generated during explosive ordnance detonations. Munitions cover a wide range of items, from 5.56 mm cartridges to Mk-83 bombs.

Calculations of pollutant emissions from munitions and pyrotechnics were based on emission factors maintained by USEPA. The emission factors are in units of mass of pollutant emitted per mass of energetic material detonated. At this point, a rough estimate of the types and quantities of various items that would be expended during the exercise has been made and the weight of the energetic material (net explosive weight) contained in each item has been determined. With the total weight of the energetic material, pollutant emissions were calculated using a generic set of emission factors that were applied against this weight of material. The generic emission factors were based on the detonation of TNT.

As can be seen in Table 4-5, estimated ordnance emissions are significantly less than 10 percent of the combined emissions from Santa Rosa, Okaloosa, and Walton counties, and therefore would not be expected to cause any potential adverse effect on ambient air quality. Any emissions effects would be temporary and would fall off rapidly with distance from the exercise site. Due to the short-term effect of exercise-related fugitive combustive emissions from aircraft and the small area affected, there would be no potential adverse cumulative impact on air quality associated with exercise-related activities.

4.7.1.3 Summary of Air Quality Impacts Under the Proposed Action

Air pollutants produced from the Proposed Action may be categorized as stationary or mobile sources. Ordnance emissions are primarily produced by a stationary source (e.g., a bomb at the

point of detonation) while aircraft emissions originate from a mobile source. A comparison of proposed Navy Pre-Deployment sorties with baseline aircraft sorties indicates that pollutants emitted annually would be comparable to those emitted during a month of baseline sorties. No Clean Air Act violations or changes to Eglin's Title V permit would occur. Stationary source emissions from proposed training using ordnance would constitute far less than 1 percent of baseline emissions for any pollutant. Therefore effects to air quality would not be significant.

4.7.2 Alternative 1

Conducting the COMPTUEX/JTFEX over a 5-day period as opposed to a 9-day period would reduce the number of sorties that would be flown by almost half, and likewise the amount of ordnance. Daily emissions over this period would be comparable to that of the Proposed Action, but the overall contribution to total Eglin emissions from COMPTUEX/JTFEX emissions under this alternative would be approximately 50 percent less than the 9-day COMPTUEX. No changes to Eglin's Title V permit would be required and no Clean Air Act violations would occur. The impacts to air quality would not be significant.

4.7.3 No-Action Alternative

Mobile and stationary emissions from Eglin sources would continue at baseline levels. No significant impacts to air quality would occur.

4.8 HAZARDOUS MATERIALS/SOLID WASTE

4.8.1 Proposed Action

The handling of hazardous material would be coordinated with AAC/EMCE, and these materials would be disposed of appropriately according to state regulations and AAC Plan 32-5, *Hazardous Waste Management Plan*. AAC Plan 32-9, *Hazardous Materials Management* describes how Eglin AFB complies with federal, state, Air Force, and DoD laws/instructions. The Proponent would follow this plan while operating on Eglin AFB. In addition, brass casings in interstitial areas would be retrieved to the extent practicable and disposed of in accordance with AAC Plan 32-5 and AAC Plan 32-9.

To avoid potential impacts from Installation Restoration Program sites, digging during training activities would be coordinated with AAC/EMR.

4.8.1.1 Impacts from Aviation Operations

Environmental impacts associated with aviation operations in overland test areas are detailed in the *Overland Air Operations Final Programmatic Environmental Assessment* (U.S. Air Force, 1998). This programmatic environmental assessment resulted in a Finding of No Significant Impact (FONSI).

4.8.1.2 Impacts from Munitions Use

Ordnance used for the Proposed Action includes the air-to-ground gunnery and bombing. Several compounds in the explosive formulations of munitions may be classified as toxic or harmful; these products may be released to the environment in the form of residues after detonation or may be deposited intact if the munition item fails to function as designed. Unexploded ordnance (UXO) are munition items that fail to function as designed and are the primary source of unintended chemical releases to the environment. The combustion of high explosives may also result in the production of a variety of toxic volatile and semivolatile organic compounds. The combustion of rocket propellant or propellant charges produces these same products.

Metallic by-products are also produced during training operations. The steel casing from gun ammunitions, projectiles, grenades, etc., would be fragmented during detonation. The steel would eventually corrode in the soil as it is oxidized to form iron oxides. Small arms ammunition would have the potential to release copper, zinc, and lead. Other metals that may reach the environment include tin, aluminum, nickel, and antimony. Table 4-6 presents chemicals or compounds typically found in munitions items or generated as by-products during munitions-related operations.

Table 4-6. Chemicals/Compounds Associated with Expendables

Metals in Alloys of Casings and Other Solid Munitions Components			
Cadmium	Chromium	Copper	Lead	Nickel
Metal Compounds in Propellant, Energetic, and Pyrotechnics (PEP), and Paints; Coatings			
Antimony Barium	Chromium Copper	Lead Mercury	Zinc
Chemicals in Propellant, Energetic, and Pyrotechnics (PEP), and Paints and Coatings			
2,4-Dinitrotoluene 2,4,6-Trinitrotoluene (TNT) 2,6-Dinitrotoluene	Ammonium Perchlorate Dibutyl phthalate Diethyl phthalate	Dimethyl phthalate Diphenylamine	HMX Nitroglycerine RDX
Possible By-products of Munitions Detonation or Destruction			
Ammonia	Hydrochloric acid	Sulfuric acid	Nitrate compounds
Other Possible Products of Combustion			
1,3-Butadiene Carbon disulfide Carbon tetrachloride Carbonyl sulfide	Chlorine Chloroform Cyanide compounds Cyclohexane	Ethylbenzene Ethylene Hydrogen cyanide Hydrogen fluoride	Hydrogen sulfide *n*-Hexane Styrene

Source: U.S. Army, 2002 (EPCRA Munitions Reporting Handbook for the U.S. Army)

Quantification of Munition Release Impacts

The first step in quantifying the potential impacts of munitions residue on the environment is to establish an accurate record of the types and quantities of munitions items used. The Range Utilization Report (RUR) details mission activities conducted on all Eglin ranges, including the types and quantities of munitions employed. Eglin generates the RUR on an annual basis and documents mission activities conducted during the previous fiscal year. Table 4-7 was generated using RUR data and presents a list of munitions items expended on training ranges A-77, Auxiliary Field 7, B-7, B-70, C-52N, C-53, C-62, and C-72 averaged over a 3-year period

(1999–2001). A comparison was then made to determine the percent increase of munition use from the COMPTUEX/JTFEX events.

Table 4-7. Percent Increase from Munitions Use – Proposed Action

Expendable	Annual COMPUTEX Expendables	Expendable Use Eglin Range (Average 1999-2001)*	Percent (%) Increase Associated with COMPTUEX
Missile	10	97	10
Bomb	1,318	393	335
Gun	12,500	145,199	9
Small Arms	51,500	1,630,932	3
Expendable	**Annual JTFEX Expendables**		**Percent (%) Increase Associated with JTFEX**
Missile	8	97	8
Bomb	989	393	252
Gun	9,375	145,199	6
Small Arms	38,625	1,630,932	2

Source: U.S. Air Force, 2000a; U.S. Air Force, 2000b
* For Field 7, B-7, B-70, C-52N, C-53, C-62, and C-72

In addition to the type and quantity of munition items, the constituent or chemical information and the potential by-products of detonation of each munition item used must be identified. The Toxic Release Inventory-Data Delivery System (TRI-DDS) is a tool that can be used to estimate this information. The TRI-DDS, which is a product of the Joint Service Emergency Planning and Community Right-to-Know (EPCRA) Workgroup, is intended to provide a consistent method to assess chemical releases and waste management data across DoD.

Although primarily intended to evaluate munitions activities for the purposes of complying with EPCRA Section 313 reporting, the TRI-DDS may also be used to quantify chemical composition of munitions relating to training or testing activities. Table 4-8 presents TRI-DDS release estimates for the COMPTUEX and JTFEX training events. The data in the table were calculated using TRI-DDS munition composition information.

Table 4-8. Munitions Constituents (lbs) for COMPTUEX and JTFEX Events

Chemical	Explosive bombs	Non-explosive bombs	Small Arms	Missiles	Total
Aluminum	17,287	285	247	507	18,325
Antimony	0	0	7	0	7
Barium	0	0	10	0	10
Chromium	12	74	0	0	86
Copper	14	77	5,945	55	6,091
Dibutyl phthalate	0	0	5	0	5
Dinitrotoluene (mixed isomers)	0	0	95	0	95
Diphenylamine	0	0	17	0	17
Iron	103,092	136,847	3,520	0	243,459
Lead	0	1	375	10	386
Lead (in brass, bronze, or stainless steel)	0	0	5	0	5

Table 4-8. Munitions Constituents (lbs) for COMPTUEX and JTFEX Events Cont'd

Chemical	Explosive bombs	Non-explosive bombs	Small Arms	Missiles	Total
Lead compounds	0	0	3	0	4
Manganese	442	1,041	38	0	1,521
Nickel	15	87	0	0	102
Nitrocellulose	0	1	1,839	0	1,840
Nitroglycerin	0	0	9	0	9
Phosphorus (in metal alloy)	42	52	1	0	96
Polyethylene plastic	98	1	0	49	147
Polyvinyl chloride	0	0	0	0	0
Potassium chlorate	0	0	3	0	3
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	17,738	0	0	0	17,738
Red phosphorus	0	23	0	0	23
Smokeless powder	0	5	0	0	5
Strontium	0	0	28	0	28
Sulfur	54	65	2	0	121
Tetracene	0	0	0	0	0
Titanium	3	1	0	1	5
Trinitrotoluene (TNT)	21,575	0	0	0	21,575
Zinc	97	7	2,130	0	2,235

* Source: TRI-DDS version 3.1, using RUR data (U.S. Air Force, 2002c) - Total chemical quantity contained in intact munition

Note: The detonation of the munition item may result in the destruction of the chemical and/or a release of the chemical to the air.

Toxicity Assessment of Munition Residue

A toxicity assessment examines the toxicity (harmfulness) of chemicals by comparing chemical concentrations with established criteria for cancerous and noncancerous health effects. For chemicals known to cause cancer, any exposure is thought to be able to cause cancer. The likelihood of cancer resulting from exposure to a chemical is expressed as a probability. For noncancer adverse effects, low exposures may not cause harm, and corresponding threshold values have been developed. Exposures below the threshold value are considered safe, and values above are considered harmful.

Human and ecological effects of munition and UXO residue is dependent upon both the availability and the concentration of the contaminant in the environment that is either inhaled, absorbed, or ingested by the receiving organism. Some contaminants, such as lead, can cause adverse effects to humans and biota at very small exposure concentrations. The effects vary between chemical contaminants, routes of exposure, and the organisms that are exposed.

Chemical Fate and Transport and Toxicity Assessment of Ordnance, in Appendix A, provides a summary of the potential adverse effects and carcinogenicity class from exposure to common munition residues/chemicals.

Summary of Potential Impacts from Munitions Use

The highest total amounts of constituents from ordnance from annual Navy Pre-Deployment Training are: aluminum (18,325 lbs); copper (6,091 lbs); iron (243,485 lbs); RDX (17,738 lbs); TNT (21,575 lbs); and zinc (2,235 lbs). These totals are based on the weight of materials in the ordnance that is expended. It is unlikely that all of the metal or explosives could become available for transport in soil, groundwater, or surface water. The amount of chemical materials from the use of missiles, small arms, and guns for the COMPTUEX/JTFEX would not be significant because there would be less than a 10 percent increase in activity on the Eglin ranges. The primary increase is shown for explosive bombs. However, approximately 96 percent of the RDX and TNT would be expended upon detonation of bombs assuming the standard non-detonation (DUD) rate of 4 percent. Based on this DUD rate only 92 bombs could potentially remain as UXO. Explosive bombs found on the Eglin ranges are detonated by Eglin explosive ordnance disposal (EOD) personnel. Any remaining UXO could potentially release chemical constituents such as explosives and metals into the environment over time. However, due to the containment of these bombs within defined areas and the low number or ordnance potentially left unexploded, the environmental impacts from COMPTUEX/JTFEX training would not be significant.

4.8.2 Alternative 1

Under this alternative of COMPTUEX/JTFEX training, the same types of munitions and aircraft and the same Eglin AFB test areas would be used, however, the number of sorties would be reduced. Thus, quantities of chemical materials that have the potential to enter the environment would be less than the Proposed Action. No impacts from chemical materials are anticipated if Eglin continues implementation of BMPs for range sustainability.

4.8.3 No-Action Alternative

Baseline missions and expenditures of munitions would continue. COMPTUEX and JTFEX missions would not be performed on Eglin ranges, thus no contribution to baseline amounts of ordnance by-products and UXO would occur.

4.9 SENSITIVE SPECIES

Noise from explosive ordnance, direct physical impacts, and habitat alteration from explosive and nonexplosive ordnance may potentially affect sensitive species. Habitat alteration is considered in the analysis of the following section as the potential to affect trees or burrows in which sensitive species live. The use of ordnance would occur on designated test areas while helicopters would land at Samson HLZ. The following areas shown in Table 4-9 may experience such activities, the occurrence of which has been analyzed previously in NEPA documentation for some areas.

Table 4-9. Potential Proposed Action Locations

Activity		Location							
		TA B-12	TA A-77	TA C-62	TA C-52N	TA C-72	TA B-82	TA B-70	HLZs
		Occurring as Part of Proposed Action & Alternatives (yes or no)/ Previously Assessed (yes or no)							
Explosive	Bombs	N/Y	Y/N	N/Y	Y/Y	Y/Y	Y/Y	Y/Y	N/N
	Gunnery		Y/Y	Y/Y	N/Y	N/Y	N/N	N/Y	
	Missiles/Rockets			N/Y	Y/Y	Y/Y		Y/Y	
Nonexplosive	Bombs	Y/Y		Y/Y			N/Y		
	Missiles/Rockets		Y/N	N/Y			N/N		

Associated NEPA documentation used in the evaluation of Navy Pre-Deployment Training effects to sensitive species is as follows.

- TA B-12: Test Area B-12 Final Programmatic Environmental Assessment (U.S. Air Force, 2000c), ARG/MEU Final Environmental Assessment (U.S. Air Force, 2003c).
- TA A-77: Air-To-Ground Gunnery: A-77, A-78, A79, and B-7 Preliminary Draft Programmatic Environmental Assessment (U.S. Air Force, 2003d), ARG/MEU Final Environmental Assessment (U.S. Air Force, 2003c).
- TA C-62: Test Area C-62 Final Programmatic Environmental Assessment (U.S. Air Force, 2002d), ARG/MEU Final Environmental Assessment (U.S. Air Force, 2003c).
- TA C-52N: Test Area C-52 Final Programmatic Environmental Assessment (U.S. Air Force, 1999), U.S. Navy COMPTUEX and JTFEX Training Final Environmental Assessment (U.S. Air Force, 2000d), ARG/MEU Final Environmental Assessment (U.S. Air Force, 2003c).
- TA C-72: Test Area C-72 Final Programmatic Environmental Assessment (U.S. Air Force, 1999a), ARG/MEU Final Environmental Assessment (U.S. Air Force, 2003c).
- TA B-82: Test Area B-82 Final Programmatic Environmental Assessment (U.S. Air Force, 2003e), ARG/MEU Final Environmental Assessment (U.S. Air Force, 2003c).
- TA B-70: Test Area B-70 Final Programmatic Environmental Assessment (U.S. Air Force, 1998a), U.S. Navy COMPTUEX and JTFEX Training Final Environmental Assessment (U.S. Air Force, 2000d), ARG/MEU Final Environmental Assessment (U.S. Air Force, 2003c).
- HLZs: Interstitial Final Programmatic Environmental Assessment (U.S. Air Force, 1998b), ARG/MEU Final Environmental Assessment (U.S. Air Force, 2003c).
- General: Overland Air Operations Programmatic Environmental Assessment (U.S. Air Force, 1998).

The analyses presented in these documents are directly applicable to this document as they analyze the potential impacts from actions similar to the Proposed Action and Alternatives to species that occur on or near the Proposed Action and Alternative action areas. The results of these analyses are summarized further in this section as impacts from noise, direct physical impacts, and habitat alteration.

4.9.1 Proposed Action

Impacts from Noise

Impacts from Aviation Operations

Red-cockaded Woodpecker (RCW) (*Picoides borealis*)

Noise from these activities would be centered around established airfields and throughout the airspace, generally at altitudes greater than 500 feet. Noise from CSAR, TERF, and HS/HSL would be concentrated at designated landing zones and over designated flight routes. There would be no effect on RCWs.

Southeastern American Kestrel (*Falco sparverius paulus*)

As described above, noise from these activities would be centered around established airfields and throughout the airspace, generally at altitudes greater than 500 feet. Noise from CSAR, TERF, and HS/HSL would be concentrated at designated landing zones and over designated flight routes. These activities would not adversely impact kestrel foraging or breeding activities.

Impacts from Explosive Ordnance

Red-cockaded Woodpecker (*Picoides borealis*)

A total of 264 Mk-82/GBU-12s, Mk-83/GBU-16/GBU-32s, and Mk-84/GBU-31s would be detonated per COMPTUEX on targets at Test Areas C-52N, A-77, and C-72. Noise from these detonations was modeled in order to predict potentially harmful noise exposure to sensitive species. Cluster bombs (CBU-99s and Rockeyes) would be delivered to TA B-82.

Test Area C-52N: Under favorable weather conditions of low winds and no temperature inversions, potentially harmful levels of noise (i.e., >140 dBP) from these bombs delivered onto targets at C-52N would not reach RCW cavity trees. Though winds and inversions can propagate noise levels beyond what would occur under favorable weather conditions, the levels of noise that are of greatest concern (i.e., >140 dBP) expand outward from the point of detonation at a speed that essentially negates wind effects. The nearest cavity tree is located over 4,000 feet away and would be exposed to between 130 and 125 dBP from an Mk-83 detonation. Figure 4-12 presents the potential noise impacts to sensitive species, specifically the RCW habitat, for TA C-52N. Typically, the number of annual detonations on TA C-52N ranges between 100 and 300 bombs with a net explosive weight of 200 pounds or greater. Thus, it is unlikely that RCWs would experience any new noise from the Proposed Action outside of the norm for this area.

Test Area A-77: Approximately 48 inactive RCW cavity trees and 14 active RCW cavity trees would be exposed to noise >140 dBP (Figure 4-11). A review of expended items on the test area from 1998 to 2001 indicates the largest net explosive weight munition recently used at this test area was a rocket with 25-lbs of explosive, which was fired twice in 1998 (U.S. Air Force, 2003). Because RCWs would be exposed to noise levels above what normally occurs on TA A-77, and in accordance with the previous COMTPUEX Section 7 Consultation (Sept, 1999) that stated if a change in activities occurs that consultation should be reinititated, an informal Section 7 consultation is being conducted to assess noise impacts to RCWs. The analysis in the Biological

Assessment indicates that the increased noise levels, because of their limited duration, are not likely to adversely affect RCWs. Additionally, TA A-77 would only be used if adverse weather conditions prohibit the use of TA C-52N as the primary target area for Mk-80 series bombs.

Test Area C-72: Maverick missile detonations were previously analyzed in the Test Area C-72 PEA. Missiles were expended onto targets TT-83 and TT-84. Noise properties of this missile under favorable weather conditions of no winds and no temperature inversions are presented in Table 4-10 below.

Table 4-10. Noise Impact Zones of Maverick Missiles (AGM-65) Detonated on Test Area C-72 for Sensitive Species*

	Zone of Lethality	Zone of Serious Injury	Zone of Slight Injury	Maximum Safety Distance
Blast (psi) Overpressures and Noise (dBP)	>35 psi >201 dB	35 to >5 psi 201 to >140 dB	5 to >0.03 psi 185 to >140 dB	< 0.03 psi <140 dB
Impact Radius	0 to 20 feet	20 to 50 feet	50 to 3,000 feet	>3,000 feet
Impact Area	1,256 square feet	6,594 square feet	28×10^6 square feet	N/A

*Human data extrapolation

Under ideal weather conditions, there are no active RCW trees within 0.03-psi overpressure or 140-dBP noise level when the Maverick missile is detonated at TT-83 or TT-84. The zone of injury around these two targets would leave the test area boundary. However, all RCW trees are located outside of the zone of injury and should not be impacted by noise. Adverse weather conditions, modeled for the Maverick missile detonation in the Test Area C-72 PEA, indicate the area of injury would expand. This area of injury (>140 dBP), as modeled with several temperature inversions and strong north-northwest winds, is closer to the test area boundary, but still would not leave the test area.

Impacts on RCWs from the firing of the Hellfire missile are considered to be less, since the lower net explosive weight (NEW) creates an even smaller maximum safety distance. Hellfire missiles are also targeted at TT-85, on the extreme southeastern edge of the test area, where the safety zone extends into the interstitial area. However, the baseline data indicates that there are no RCW trees in the vicinity of this corner, and noise from the detonation of Hellfire missiles should not impact RCW cavity trees with detrimental overpressures. Use of TT-85 for the Mk-80 series munitions would potentially result in adverse noise effects to the RCW colony northwest of this target.

Figures 4-12 and 4-13 present potential noise impacts from the largest NEW ordnance, the GBU-31/Mk-84, to sensitive species near test areas C-52N and C-72, respectively.

Test Area B-82: Previous analysis of explosive ordnance in the Test Area B-71/82 PEA indicated that noise from Mk-82s would not affect RCWs; likewise, the smaller NEW cluster bombs would have no effect on RCWs.

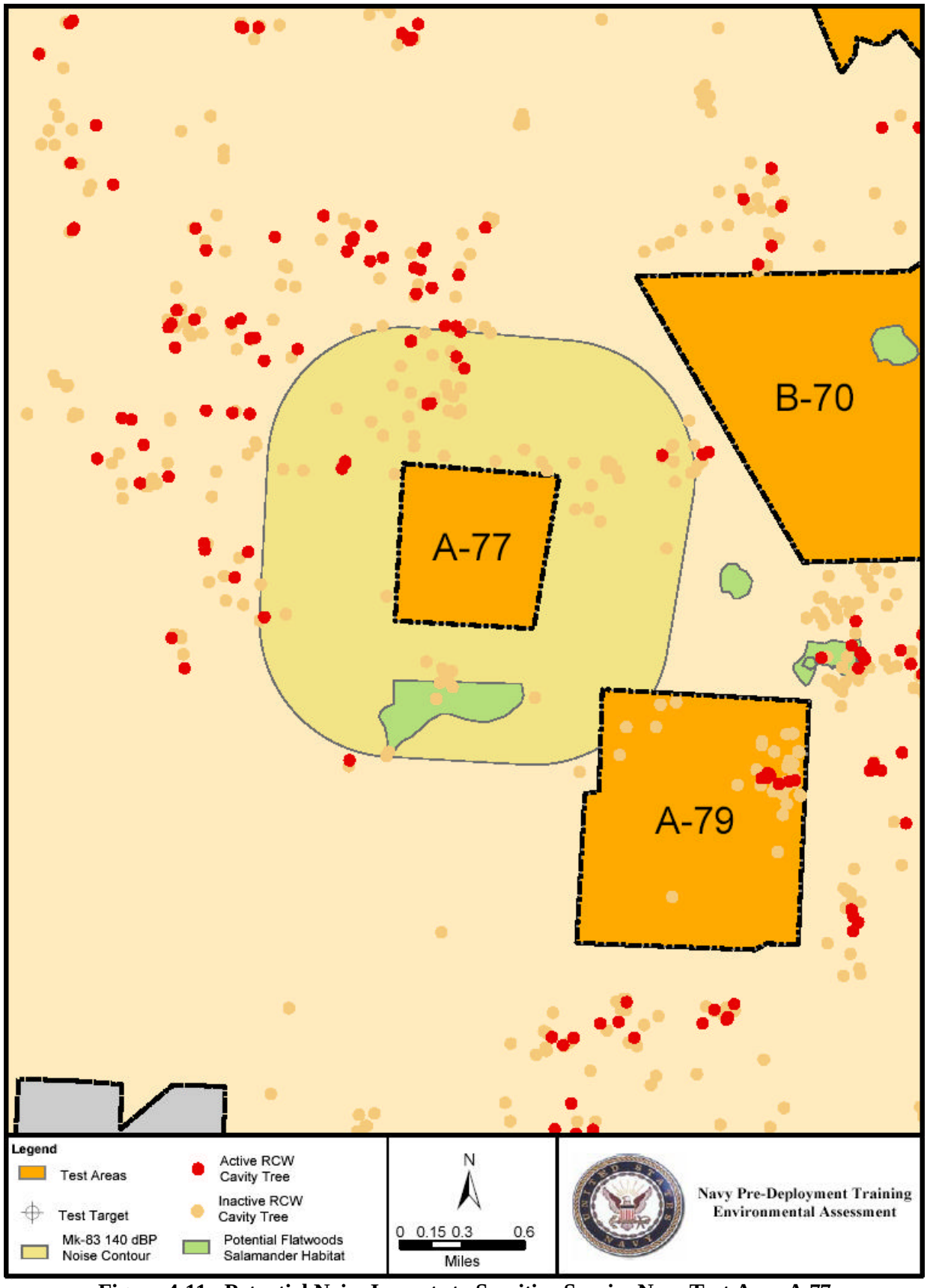

Figure 4-11. Potential Noise Impacts to Sensitive Species Near Test Area A-77

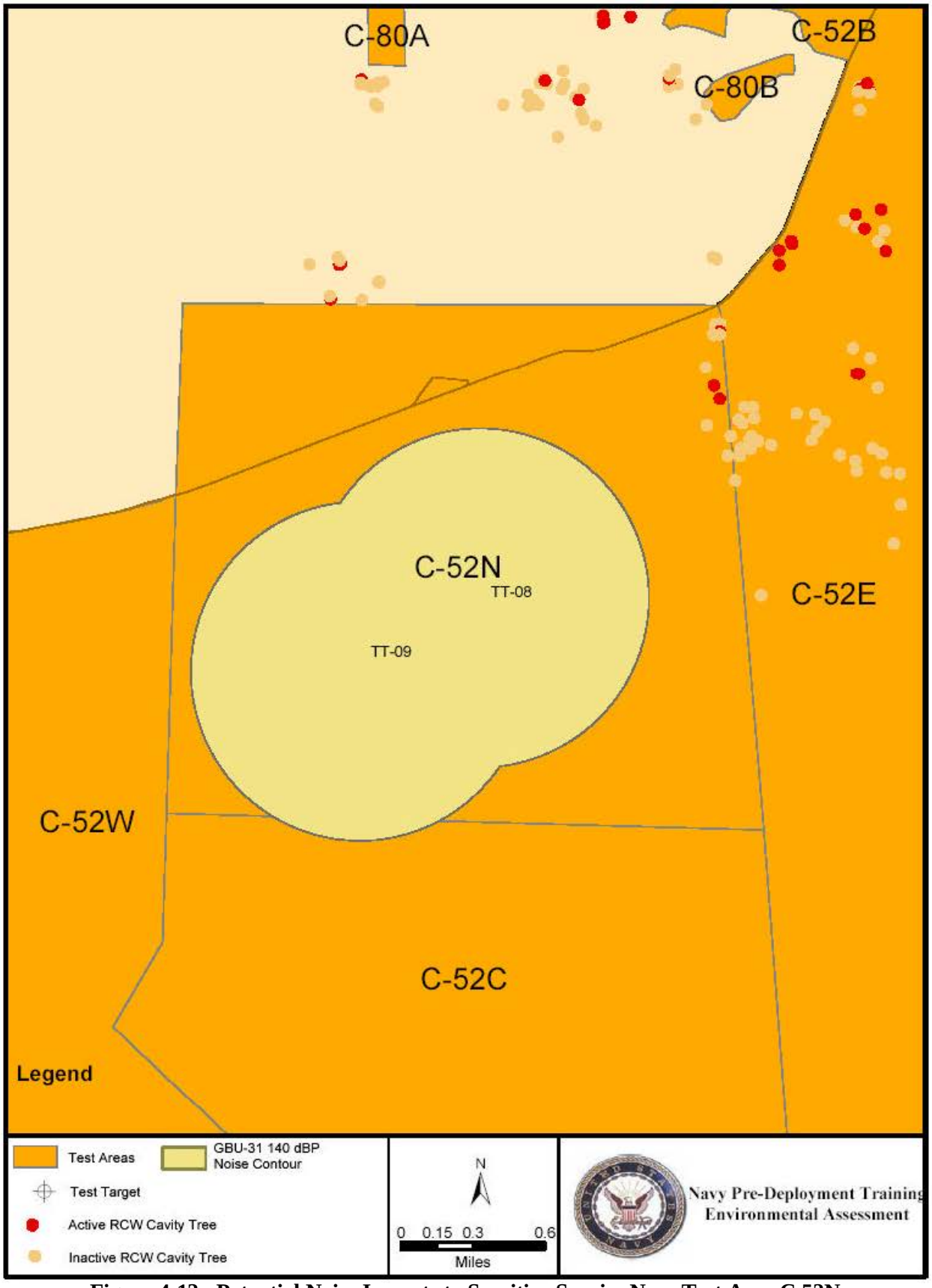

Figure 4-12. Potential Noise Impacts to Sensitive Species Near Test Area C-52N

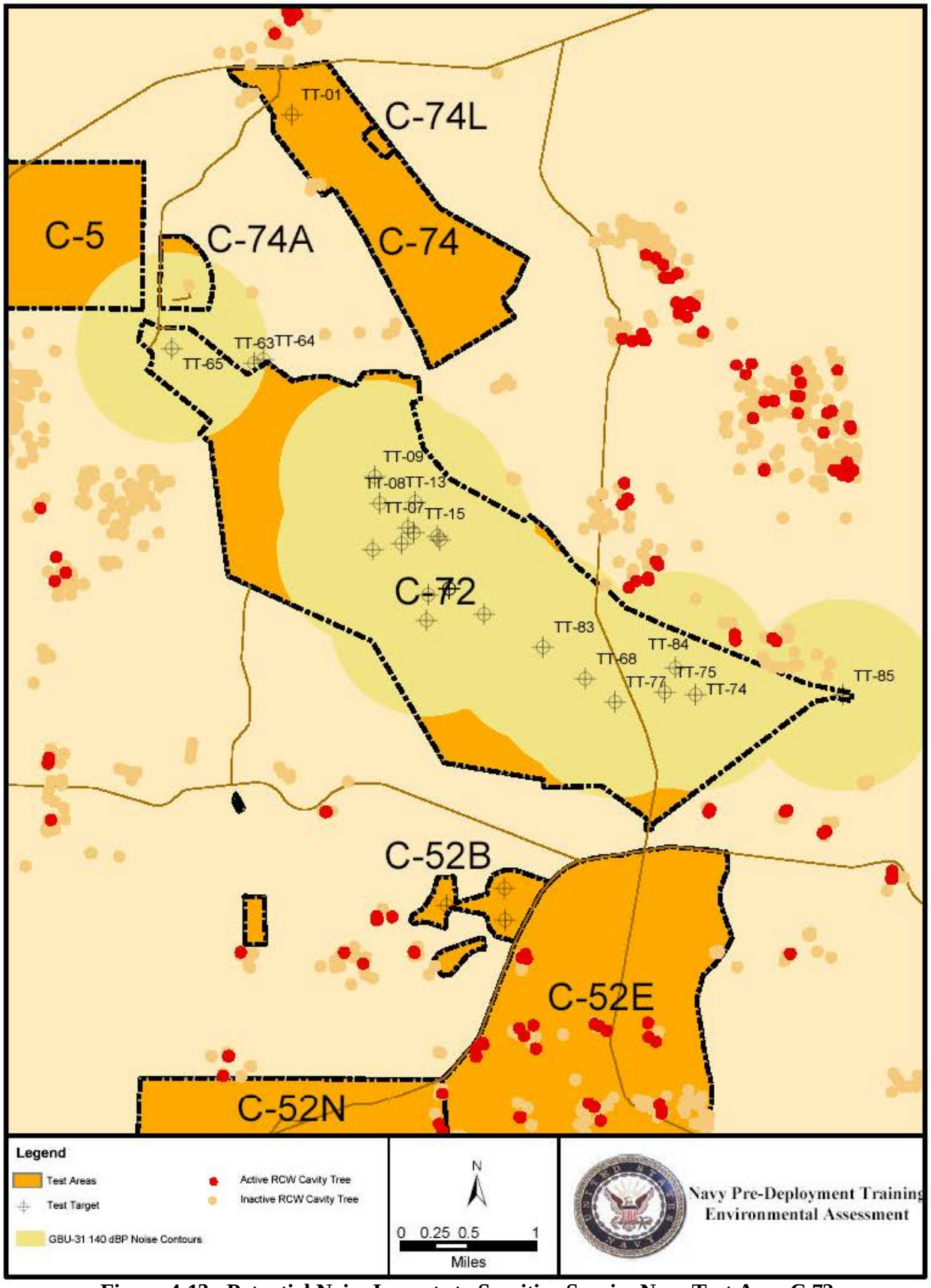

Figure 4-13. Potential Noise Impacts to Sensitive Species Near Test Area C-72

Flatwoods Salamander (*Ambystoma cingulatum*)

Approximately 83 acres of potential flatwoods salamander habitat would be exposed to noise greater than 140 dBP from explosive Mk-83 munitions at TA A-77, the only proposed test area where this species may be of concern. Amphibians do not exhibit a well-developed acoustic startle response and are often regarded as nonsusceptible to noise impacts (U.S. Fish and Wildlife Service, 1988). In addition, this species lives in moist soil, leaf litter, and at times in ponds, which would have some dampening effects on bomb noise. Thus noise impacts to the population would not be significant.

Southeastern American Kestrel (*Falco sparverius paulus*)

The southeastern American kestrel is a raptor that hunts in clearings and woodland edges; thus it may be expected to occur on Grassland/Shrubland ecological associations of test areas or on the perimeter of these areas. No quantitative information for this species at Eglin has been collected. It is known, however, to nest in abandoned RCW cavity trees. Thus, exposure to noise from proposed Navy Pre-Deployment training may be similar to that experienced by RCWs. Since bomb noise is an ongoing occurrence at Eglin to which kestrels have likely been exposed, and there is no indication that the kestrel population is decreasing at Eglin, significant impacts to kestrels are not anticipated from the Proposed Action.

Gopher Tortoise (*Gopherus polyphemus*)

Gopher tortoises occur throughout the reservation on the test areas and in the interstitial areas. Some exposure to noise of high intensity is possible from Navy Pre-Deployment training. There are no noise criteria or thresholds for hearing impacts to this species, though clearly there exists some level of blast noise that would be harmful. Generally, the most harmful levels of noise would occur within a few hundred feet of the largest munitions (i.e., Mk-80 series). Given that the expected density of gopher tortoise within 300 feet of a given target is typically much less than one, large numbers of this species would not be affected.

Florida Burrowing Owl (*Athene cunicularia floridana*)

Florida burrowing owls are only located on Test Area B-70, which is proposed for nonexplosive munitions use. Based on this, no noise impacts to this species would occur. Noise from nearby Test Area B-82, which would be used for cluster bomb munitions, would not be of sufficient intensity to affect burrowing owls on TA B-70, which have historically tolerated noise from larger net explosive weight munitions and high overpressures from supersonic overflights. This species is afforded protection from noise and shrapnel by the burrows in which it lives.

Dusky Gopher Frog (*Rana capito servosa*)

Amphibians do not exhibit a well-developed acoustic startle response and are often regarded as nonsusceptible to noise impacts (U.S. Fish and Wildlife Service, 1988). Additionally, gopher tortoise burrows are frequent habitats for the gopher frog, affording a level of protection against the effects of some noise disturbance. There is the potential to entomb some species if noise overpressures cause burrow collapse; however, no data are available that correlates a relationship between noise overpressures and this phenomenon.

Pine Barrens Tree Frog (*Hyla andersonii*)

As stated previously, amphibians do not exhibit a well-developed acoustic startle response and are often regarded as nonsusceptible to noise impacts (U.S. Fish and Wildlife Service, 1988). Additionally, any potential noise impact would be intermittent and temporary and would most likely result in a startle and movement response. This disturbance would not result in mortality or injury to the animal. As a result, no significant adverse impacts to tree frog population viability or sustainability are expected.

Sherman's Fox Squirrel (*Sciurus niger shermani*)

Potential noise impacts would be intermittent and temporary and would most likely result in a startle and movement response. This disturbance would not result in mortality or injury to the animal. As a result, no significant adverse impacts to fox squirrel population viability or sustainability are expected.

Direct Physical Impacts

Direct physical impacts (DPI) occur when a species is physically harmed or harassed by an activity/action. For the Proposed Action and Alternatives, direct physical impacts may occur from nonexplosive bombs, shrapnel from explosive missiles, impact from the use of gunnery, and vehicles or troop movement (crushing). The criteria for evaluating direct physical impacts from the use of ordnance initially consider the proximity or density of a resource to the expected point of impact. Species locations and densities are discussed in Chapter 3, Affected Environment. Next, calculating impact zones for nonexplosive and explosive munitions and shrapnel dispersal radii for explosive munitions provides a means to determine the number of resources that could potentially be impacted. For DPI associated with vehicle use and troop movement, locations of sensitive species are identified based on the proximity of movement corridors, and the potential for encounters is evaluated.

Direct Physical Impacts from Nonexplosive Bombs

Nonexplosive bombs include nonexplosive practice, cluster, guided, and general purpose bombs expended during air-to-surface testing and training. Generally, nonexplosive weapons lack an explosive warhead, but are filled instead with concrete and/or a data-gathering telemetry package. For the purposes of analysis, these weapon systems are classified as nonexplosive, even though some may contain small amounts of explosive. For example, practice bombs contain .083 lb of explosive to aid support personnel in spotting and scoring the impact. Cluster bombs dispense submunitions by means of an explosive charge, but the submunitions are nonexplosive. Nonexplosive bombs and missiles remain relatively intact upon impact with the ground and are periodically retrieved.

Upon impacting the ground, nonexplosive munitions may penetrate the earth or skip off the surface, depending on the weight of the bomb or angle of entry. Heavier bombs (> 500 lbs) can penetrate up to 50 feet deep, leaving little trace of entry. Lighter bombs (5 to 50 lbs) have a tendency to skip, especially if the angle of descent is shallow. Guided bombs enter at a more vertical angle and are less likely to skip. According to the Eglin Safety Office, the maximum distance a munition has skipped is approximately 12,000 feet.

The issue associated with using nonexplosive bombs and missiles is the potential for munitions to directly strike gopher tortoises, burrowing owls, RCWs, and Okaloosa darters. Direct physical impacts could result from nonexplosive bombs and missiles if sensitive species are located near targets and are struck, or if broaching munitions skip and skid across the test area or even out of the test area.

Analysis of DPI first considers the location and number of munitions as recorded by target, with the assumption made that 95 percent of non-guided munitions fall within 300 feet of their intended target. This is based on information collected from a COMPTUEX at Avon Park Air Force Range (U.S. Air Force, 1997a). Guided bombs are more accurate, with 95 percent landing within 25 feet of the intended target (U.S. Air Force, 1997a). Because of the accuracy of guided munitions, as well as the low percentage of munitions proposed to be expended per 9-day event that are guided munitions (15 percent, or 263, to include GBUs, LGTRs, and missiles), attention would focus on the potential impacts of non-guided munitions. Analysis of impacts then proceeds with the proximity of sensitive species relative to the nonexplosive bombs and missiles expended on the test areas.

Based on the accuracy assumptions of nonexplosive munitions, impacts of nonexplosive munitions to sensitive species are measured by determining the location and density of sensitive species that occur within 300 feet of a given target, and then calculating the probability of a species being struck based on the number of potential ordnance releases per target.

There are no species identified within 300 feet of any target. The only species that would be potentially impacted by nonexplosive munitions is the gopher tortoise.

Based on calculations for gopher tortoise density, the following Table 4-11 shows an estimation of the number of potential active and inactive tortoise burrows per target-area 300-feet buffer, and the respective number for all test area target locations.

Table 4-11. Gopher Tortoise Burrows on Test Areas

Location	Estimated Number of Burrows/300-Feet Buffer		Total Estimated Number of Burrows within Target Areas	
	Active	Inactive	Active	Inactive
TA B-12	.065	.065	<1	<1
TA A-77			~1	~1
TA C-62			<1	<1
TA C-52N			~1	~1
TA C-72			~1	~1
TA B-82*			<1	<1
TA B-70			~1	~1

*The TT-1 grid on TA B-82 is approximately 105 acres. With the addition of a 300-feet buffer around the TT, the total area then becomes about 150 acres.

Direct Physical Impacts from Missiles and Shrapnel

Sensitive species could potentially be killed from missiles and shrapnel. Analysis of potential impacts is conducted by estimating the number of such species occurring within the impact/shrapnel radius of the targets that would be used on each test area. The test areas that

would potentially experience the use of explosive bombs and missiles and the relative ordnance type and estimated maximum shrapnel/fragmentation travel distances are shown in the following Table 4-12.

Table 4-12. Potential Use of Explosive Bombs and Missiles

<table>
<tr><th rowspan="2">Ordnance</th><th rowspan="2">Max Fragmentation Distance (ft)*</th><th colspan="4">Location</th></tr>
<tr><th>TA A-77</th><th>TA C52N</th><th>TA C-72</th><th>TA B-82</th></tr>
<tr><td>Mk-82</td><td>2,252</td><td colspan="3" rowspan="6">✓</td><td rowspan="8">N/A</td></tr>
<tr><td>Mk-83</td><td>2,000</td></tr>
<tr><td>GBU-12**</td><td>2,252</td></tr>
<tr><td>GBU-16***</td><td>2,000</td></tr>
<tr><td>2.75 in Rockets</td><td>1,702</td></tr>
<tr><td>5 in TOW</td><td>2,441</td></tr>
<tr><td>Maverick Missile[1]</td><td>3,525</td><td rowspan="5">N/A</td><td colspan="2" rowspan="3">✓</td></tr>
<tr><td>JDAM (1,000 lbs)[2]</td><td>2,000</td></tr>
<tr><td>JDAM (2,000 lbs)[2]</td><td>3,232</td></tr>
<tr><td>Hellfire Missile[3]</td><td>3,525</td><td rowspan="2">N/A</td><td>✓</td></tr>
<tr><td>Mk-20/CBU-99[4]</td><td>Unavailable</td><td>N/A</td><td>✓</td></tr>
</table>

* Information acquired from the *Range Safety Officer Training Handbook* (U.S. Air Force, 1992)

** The GBU-12 contains an Mk-82 blast/fragmentation warhead – the fragmentation distance for the Mk-82 was used here.

*** The GBU-16 is a modified Mk-83 – the fragmentation distance for the Mk-83 was used here.

[1]Information taken from the *TA B-70 Final Programmatic Environmental Assessment* (U.S. Air Force, 1998a)

[2]The JDAM is an upgraded version of the Mk-83 (1,000 lbs) and the Mk-84 (2,000 lbs) with new designations (the GBU-31 and GBU32, respectively) – The respective Mk series fragmentation distances are used here.

[3]Information on the fragmentation distance for the Hellfire missile was unavailable. The fragmentation distance for the Maverick is used here.

[4]While this is a cluster bomb, it is only being used on TA B-82. The only sensitive species associated with TA B-82 is an Active RCW tree more than 2,000 feet from the edge of the test area. This would likely not be impacted from bomb fragments as the bombs would not be targeted near the edge of the test area.

The radius for guided munitions impact is 25 feet from the center of the target, since it is assumed that 95 percent of the missiles would land within 25 feet of their intended target. For guided munitions, this is a reasonable assumption (U.S. Air Force, 1997a). For unguided munition (i.e., Mk-80 series), a 300-feet distance applies. To this is added the appropriate shrapnel dispersal radius for each missile obtained from the Eglin Safety Office. The entire impact/shrapnel radius is overlaid on species distributions to determine the number of species potentially impacted. Analysis ends at this point since the probability of a species being struck by a falling missile or from shrapnel could not be calculated.

Table 4-13 presents analysis of direct physical impacts at proposed high use test areas. Because it is unknown exactly which targets would be utilized on each test area, impact analysis is based on the largest safety footprint occurring at each test area applied to all available targets on the test area, thereby identifying the maximum number of species potentially impacted per target given that all targets are eventually used during a 9-day event. In the case of gopher tortoises, this is determined by identifying the number of potential species occurrences within the fragmentation distance of each target. Active RCW trees can actually be counted. Because of the transient nature of other species (i.e., indigo snakes, bears, etc.), impacts to these species are unlikely and were therefore not analyzed. No species would be impacted by direct hit as there are no species within 300 feet of any target.

Table 4-13. Direct Physical Impacts Analysis for Proposed High Use Test Areas

Ordnance	Max Fragmentation Distance (ft) + Impact Area*	Location		
		TA A-77	TA C-52N	TA C-72
		# Maximum Species Potential Impacted		
Mk-82	2,552	37 active/37 inactive gopher tortoise burrows/target 45 total active RCW trees	Larger footprints apply	
Maverick Missile	3,550	N/A	35 active/35 inactive gopher tortoise burrows/target	35 active/35 inactive gopher tortoise burrows/target 5 active RCW trees
Hellfire Missile		N/A	N/A	

* Unguided munitions have a 300-feet impact zone; guided munitions, 25 feet.

The actual number of potentially impacted species would likely be much smaller, as many of the fragmentation footprints fall outside the cleared portion of the test area. Foliage along the border of the test area and within the interstitial areas would serve to reduce the potential for fragments to travel far beyond the test area.

Direct Physical Impact from Gunnery

AAC/EMSN projects that the probability for a bullet to directly hit an RCW is low and stray bullets have never been documented to kill an RCW or an RCW cavity tree on Eglin AFB (Hagedorn, 2003). In one instance near a test area on Eglin, a bullet was documented as protruding into the bottom of an RCW cavity with no negative impacts to the birds living in the cavity (Hagedorn, 2003). Lethal direct physical impacts to RCWs and RCW cavity trees from bullets or shrapnel are not anticipated at any of the test sites. The probability of a stray bullet to strike any other species is considered extremely low and considered not significant. As a result, DPI to species from gunnery has not been analyzed further.

Gopher Tortoise

The largest bomb that would be dropped for which information was available is the Mk-83, which is approximately 119.5 inches in length and 14.06 inches in diameter. The most frequently dropped bomb would be the Mk-76. Dimensional information was unavailable, but based on weight, it is assumed to be similar to the BDU-33, which is approximately 30 inches in length and 4 inches in diameter. Because of the uncertainty regarding which targets would be used on each test area, it is assumed that all targets would be used. A maximum of 264 Mk-80 series bombs and 1,000 Mk-76 bombs could be dropped during the 9-day COMPTUEX/JTFEX event. For simplicity, the analysis considers all bomb drops for the 9-day period as independent events dropped over the course of one day.

Assuming all bombs create a maximum impact area by landing lengthwise, a Mk-83 would have a maximum body-length impact area of about 12 square feet, while a Mk-76 would have a maximum body-length impact area of about 0.83 square feet. There are about 282,743 square feet within a 300-feet buffer around a target.

Given the above information there would be about 23,562 impact areas for the Mk-80 series (282,743 divided by 12) and about 340,654 impact areas for the Mk-76 (282,743 divided by 0.83).

For the Mk-80 series, assuming the inhabitants of a burrow occupy one square foot, the probability of impact is 12 (bomb impact area) x .065 burrows (per square foot)/23,562 potential impact areas = 0.003 percent or 1 in 36,000. It is assumed that 95 percent of the bombs dropped land within 300 feet of the intended target, which equates to 250 Mk-83s. If those 250 Mk-83s land within the 300-feet radius and are assumed to impact different areas, the probability of impacting a burrow increases to 0.83 percent, or 1 in 121.

For the Mk-76, using the same assumptions for the Mk-80 series, the probability of impact is 0.83 (bomb impact area) x .065 burrows (per square foot)/340,654 potential impact areas = 0.00002 percent or 1 in 6,300,000. It is assumed that 95 percent of the bombs dropped land within 300 feet of the intended target, which equates to 950 Mk-76s. If those 950 Mk-76s land within the 300-feet radius and are assumed to impact different areas, the probability of impacting a burrow increases to 0.02 percent, or 1 in 6,645.

Based on this highly conservative analysis, it is unlikely that any adverse impacts to the gopher tortoise or burrows would occur as a result of direct impact from a bomb. Guided munitions would have even less of a chance for tortoise burrow strikes due to the accuracy of the munition.

Red-cockaded Woodpecker (Picoides borealis)

The RCW is not at risk for a direct strike from a bomb. However, the RCW may be susceptible to bomb fragments from explosive ordnance. Noise impacts to the RCW are discussed in Section 4.2, Noise.

At TA A-77, approximately 45 active RCW trees are within the combined maximum fragmentation footprint of all targets. The chances of an impact from bomb fragments could not be calculated, but are considered to be remote given that the majority of the fragmentation footprints fall outside the cleared portion of the test area. However, foliage along the border of the test area and within the interstitial areas would serve to reduce the potential for fragments to travel far beyond the test area. As a result, no adverse impacts to RCWs from bomb fragments are anticipated.

Okaloosa Darter (Etheostoma okaloosae)

Okaloosa darters are not at risk for a direct bomb strike. Additionally, the potential for direct physical impact from bomb fragments is a remote occurrence, further minimized by this species' location in select stream areas of lower topography surrounded by woods. Streams are not located within the 95-percent impact area for nonexplosive munitions.

Flatwoods Salamander (Ambystoma cingulatum)

Flatwoods salamanders are not at risk from a direct munitions strike or from bomb fragments. The closest potential habitat exists near Test Area A-77 and is beyond the 95-percent probability range for a direct hit. Confirmed salamander ponds are outside the region of influence for the

ordnance activities of the Proposed Action, being several thousand feet away from the nearest live test area.

Eastern Indigo Snake (Drymarchon corais couperi)

Potential direct physical impacts to this species would be similar to that of the gopher tortoise since they often use the same burrows. Indigo snakes could potentially occur almost anywhere on the reservation, though no reliable information exists on their distribution and movements. The probability of their occurrence near targets is considered low due to the availability of better habitat elsewhere.

Other Sensitive Species

While not federally listed as threatened or endangered, other sensitive species that may be potentially impacted by COMPTUEX/JTFEX activities include the following.

- Pine Barrens Tree Frog (*Hyla andersonii*)
- Bog Frog (*Rana okaloosae*)
- Southeastern American Kestrel (*Falco sparverius paulus*)
- Dusky Gopher Frog (*Rana capito sevosa*)
- Sherman's Fox Squirrel (*Sciurus niger shermani*)

However, the potential for impacts is considered minimal, as these species are not known to be prolific throughout the Eglin Reservation. As a result, adverse impacts to these species are not anticipated from the Proposed Action.

4.9.2 Alternative 1

Impacts from Noise

The degree of potential impact from noise to sensitive species would be the same for this alternative as for the Proposed Action, but the likelihood of occurrence would decrease. Conducting the COMPTUEX over a 5-day period as opposed to a 9-day period would result in fewer days of explosive bombing activity, potentially fewer overall expenditures, and thus a lower probability that a sensitive species would be exposed to potentially harmful noise levels. The potential for noise impacts to sensitive species would not be significant.

Direct Physical Impacts

Under this alternative in which a 5-day COMPTUEX would be conducted, species would be less likely to be directly struck by bombs or bomb fragments due to lower numbers of expenditures and fewer days of bombing activity. No significant direct physical impacts to sensitive species would occur.

4.9.3 No-Action Alternative

Baseline activities with the potential for noise and direct physical impacts would continue under this alternative as would management of sensitive species by the U.S. Air Force. No significant impacts to sensitive species would occur under this alternative.

4.10 SENSITIVE HABITATS

Sensitive habitats include terrestrial or aquatic communities, such as wetlands, that may be potentially affected from direct explosive or nonexplosive ordnance impacts, or from wildfires started by explosive ordnance use. Ordnance may land in sensitive habitats and cause damage directly from detonation, or indirectly from retrieval operations where heavy equipment is necessary to extract a munition that did not detonate as planned (i.e., a DUD). The habitats considered in this evaluation are wetlands, sensitive species breeding ponds, RCW cavity trees, Tier I plant communities, and significant botanical sites.

4.10.1 Proposed Action

Impacts from Munitions Use

One hundred percent of unguided Mk-80 series munitions would land within 5500 feet of their intended target (U.S. Air Force, 2000d). Figures 4-14 through 4-17 illustrate sensitive habitats near the explosive and nonexplosive test areas within 95 percent (300 feet from target) and the remaining 5-percent (5500 feet from target) impact probability buffers drawn around candidate target sites.

Where target sites are unmapped, the buffers were drawn from the perimeter of the test area. The 95-percent and 5-percent impact areas are based on the expected accuracy rate of unguided Mk-80 series munitions and were derived from analysis of a previous Navy exercise on Eglin AFB (U.S. Air Force, 2000d).

Direct Impacts to Habitats

Test Area C-72: Wetland areas and Tier I areas are located within the 5-percent impact area of targets on this test area. Only TT-85 in the extreme southeast corner of TA C-72 has a sensitive habitat, a Tier I plant community, directly adjacent to its 95-percent impact area. A number of other targets would be available in which to distribute ordnance. To estimate the number of munitions that could land in sensitive habitats, the maximum explosive and nonexplosive ordnance projected for C-72 was totaled. In reality, this amount would be distributed over several test areas but this assumption serves to provide a worse case situation. Total unguided nonexplosive and explosive ordnance for C-72 for one COMPTUEX event is about 2800 bombs.

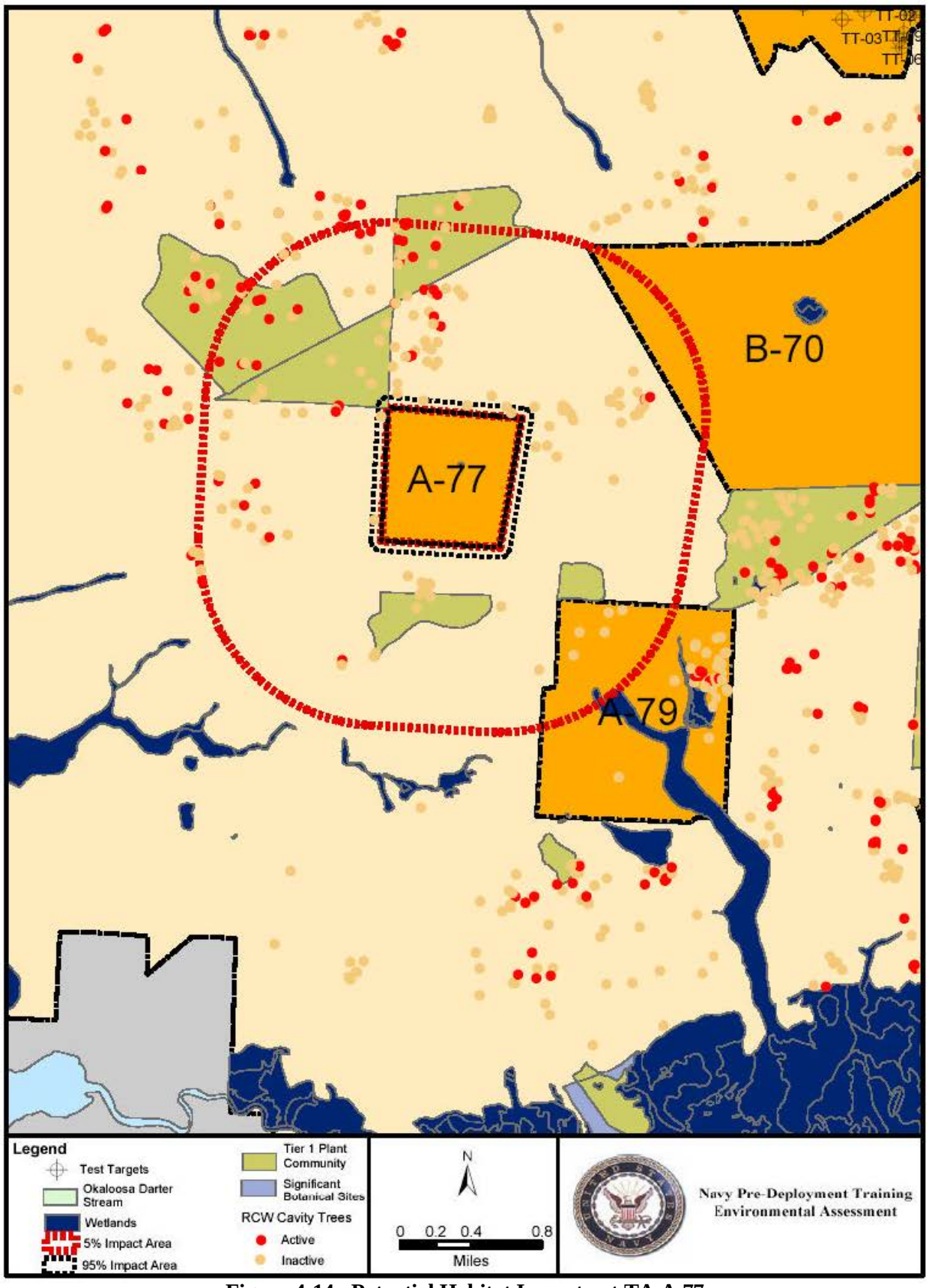

Figure 4-14. Potential Habitat Impacts at TA A-77

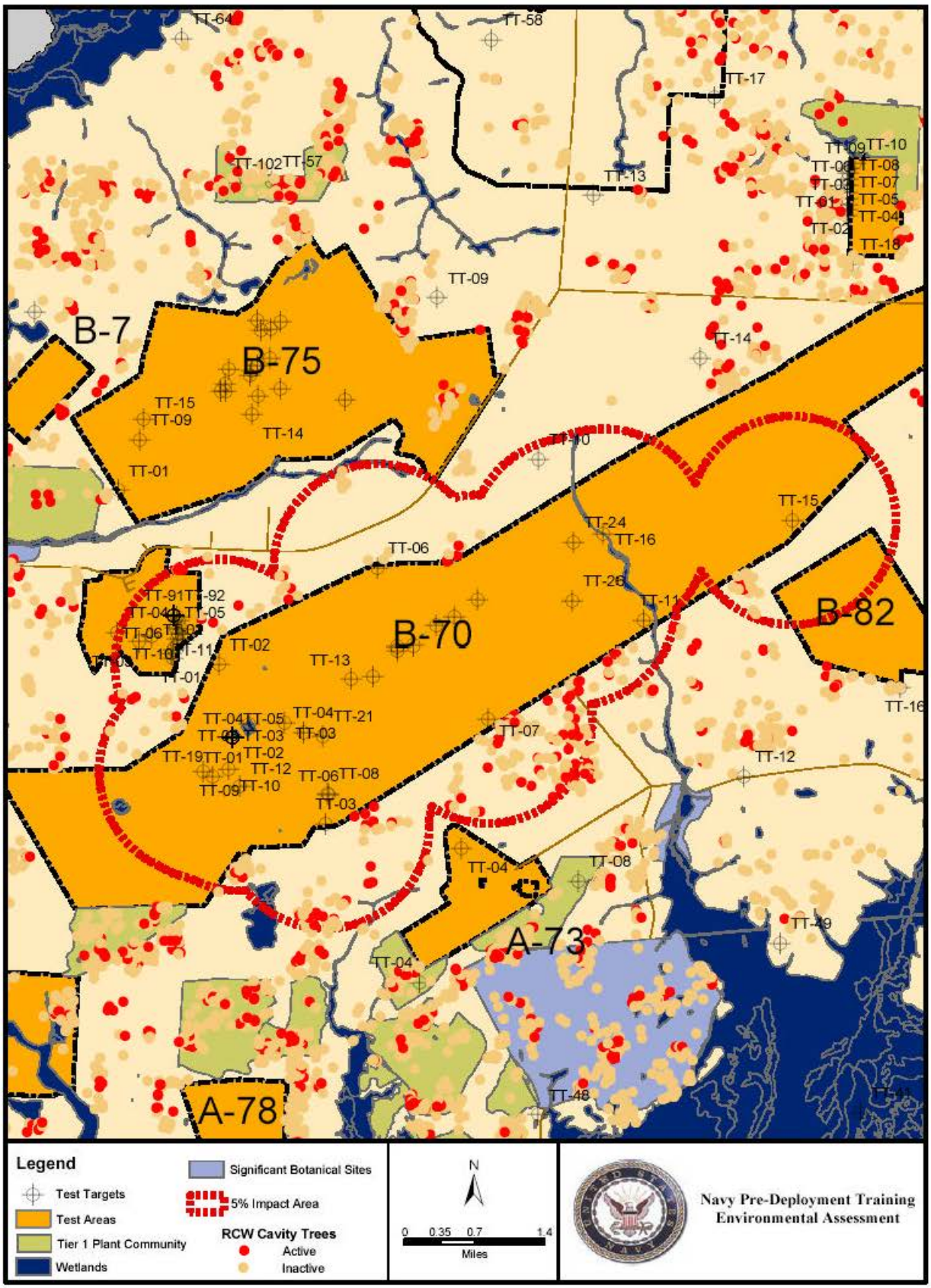

Figure 4-15. Potential Habitat Impacts at TA B-70

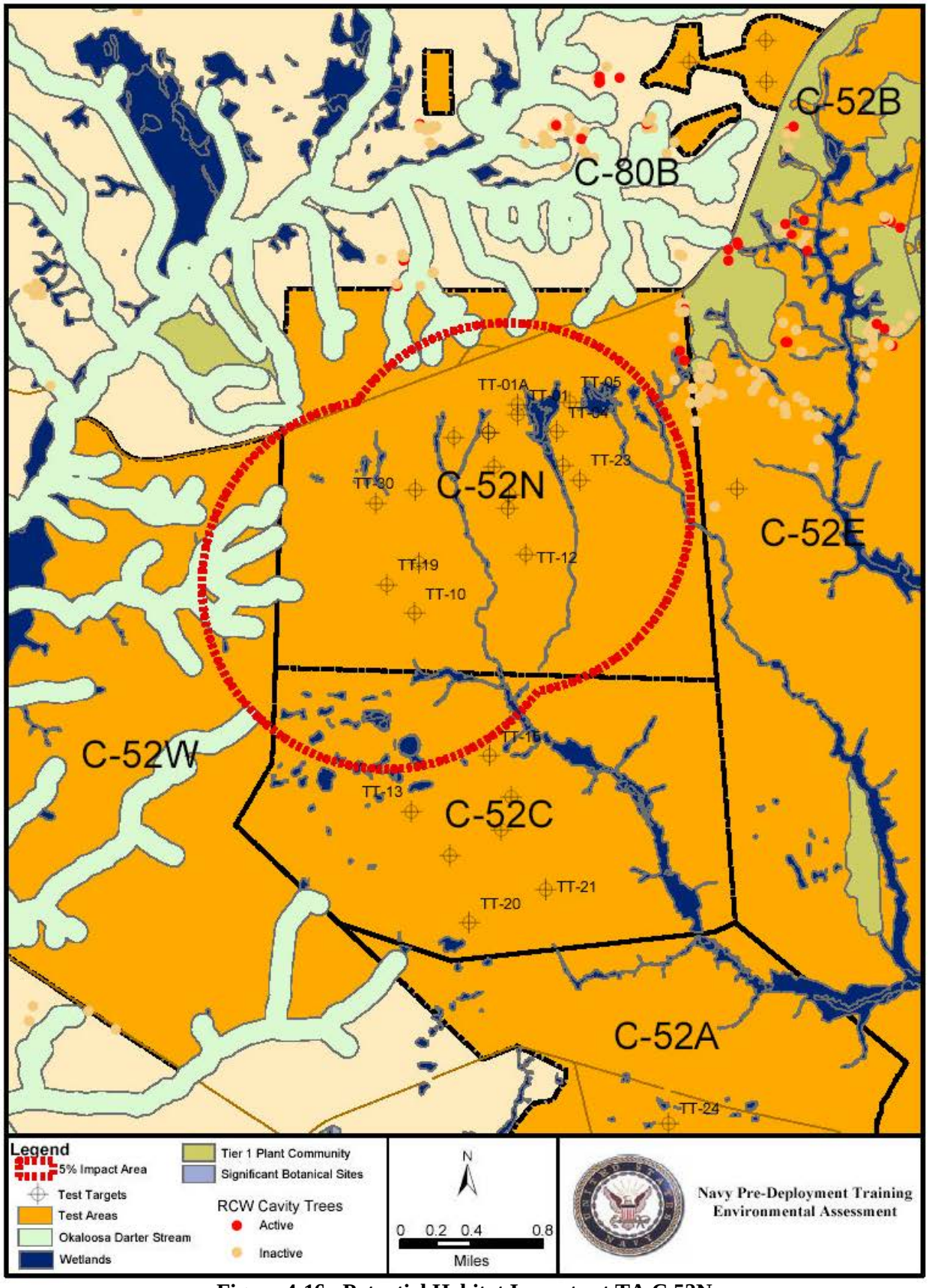

Figure 4-16. Potential Habitat Impacts at TA C-52N

Figure 4-17. Potential Habitat Impacts at TA C-72

If 95 percent (2660 bombs) lands within 300 feet of their intended target and thus do not impact any sensitive habitats (no sensitive habitats occur within 300 feet of any target) then the potential for impact lies with the remaining 5 percent or 140 bombs. Averaging the available targets yields a total of seven bombs per target that may land beyond the 95-percent target impact area, and thus potentially affect some sensitive habitat. It should be understood that in reality this number of bombs would be distributed among several test areas. In Figure 4-17, the only Tier 1 area near a target is located adjacent to TT-85. Streams and their associated wetland areas are located on Test Area C-72 and would potentially be affected. All of the streams on Test Area C-72 are habitat for the federally endangered Okaloosa darter. Thus, there is a potential for nonexplosive or explosive bombs to impact darter habitat by altering hydrology or increasing sedimentation. In the event a munition does directly impact a stream, Eglin Natural Resources personnel should be contacted to advise in the removal operations. Due to the potential to affect darter habitat, consultation with the USFWS may be required for explosive and nonexplosive bombs on this test area.

Test Area C-52N: There are no sensitive habitats within the 300-feet 95-percent impact area of targets TT-8 and TT-9 (Figure 4-16). These targets are heavily used for bombing at TA C-52N. Within 5500 feet of these targets there are primarily non-darter streams and wetlands with the exception of a darter stream and tributaries located on the westernmost boundary of TA C-52N. Some percentage of munitions could impact these streams; however, their location away from the center of targets minimizes the potential for impact.

Test Area A-77: Tier 1 plant communities are located adjacent to Test Area A-77 and would potentially be affected by a munition landing outside of the 300-feet 95-percent impact area (Figure 4-14). Given that the majority of the area within the 5-percent buffer is not considered to be sensitive habitat, the occurrence of impacts is remote.

Test Area B-12: With the exception of the 25-lb Mk-76 nonexplosive munition, all bombs delivered onto Test Area B-12 would be guided munitions. Guided munitions have a more accurate impact rate with a smaller 95-percent impact area of approximately 25 feet. Impacts to sensitive habitats are unlikely since most of the munitions are expected to land very close to their targets.

Test Area C-62: This test area would not be used for explosive ordnance or large unguided bombs. Up to 2500 Mk-76 nonexplosive bombs would potentially be dropped onto this test area. Retrieval of these nonexplosive munitions would be conducted during routine range maintenance operations of this test area. Heavy equipment would not be required for munitions on the surface, and buried nonexplosive munitions are often left in place.

Test Area B-70: With the exception of Live Oak Creek and Bull Pond, there are no sensitive habitats within the 95-percent or 5-percent impact areas (Figure 4-15). There are a number of targets located away from these two features such that impacts to the associated wetland areas could be easily avoided.

Potential Impacts from Wildfire

On Eglin, RCWs occupy open, park-like stands of longleaf pine sandhills and flatwoods. These habitats require frequent prescribed fire to maintain their grassy understory and to prevent midstory encroachment. In the absence of frequent fire, hardwoods quickly encroach into the midstory of longleaf pine ecosystems, allowing predators access to cavity trees. For the RCW,

fire maintains the native groundcover that supports the insects and other arthropods upon which RCWs feed. While prescribed fire is critical for the management of the RCW, wildfires under dry or windy conditions may cause substantial mortality to RCW cavity trees. Preparation of individual trees, such as removing vegetation around the base of the tree and scraping sap off the base of the tree because a sap-covered tree more readily catches fire, has been demonstrated to prevent potential damage to RCW cavity trees from fire (U.S. Air Force, 2003).

RCWs are found near or on several of the Proposed Action test areas. Explosive ordnance from Navy Pre-Deployment Training may potentially result in wildfires. Historically on Eglin, explosive ordnance, live ammunition, and the use of incendiary devices have resulted in frequent wildfires. In association with activities occurring on it and adjacent test areas, the area near Test Area A-77 has the highest density of wildfires on the Eglin Reservation, averaging two large (>900 acres) wildfires each year from 1998 to 2002. An average of 12 active and inactive cavity trees exposed to wildfire eventually died from the fire or other causes.

While estimating the number of wildfire potentially produced from Navy Pre-Deployment Training is difficult, the occurrence can be minimized. Typically on Eglin, wildfire prevention is addressed through monitoring of a wildfire index that evaluates the potential for such an event to occur. Also fire control personnel are on hand for missions with a potential for starting wildfires.

To minimize the potential for wildfires from Navy Pre-Deployment Training, the Proponent would coordinate with the Resource Scheduling and Operational Management System (RESOMS) to verify wildfire condition status and would consult Eglin's Wildfire Specific Action Guide Restrictions to manage explosive ordnance use as appropriate with fire index conditions.

Given the procedures in place for managing, minimizing, and responding to wildfires Navy Pre-Deployment Training is not expected to have a significant impact on sensitive habitats.

Impacts from Aviation Operations

No impacts to sensitive habitats are anticipated as the result of aviation operations.

Impacts from Wheeled and Tracked Vehicles

On the Eglin Range, wheeled and tracked vehicles would follow existing range roads wherever possible to objective locations. Tracked vehicles would travel dirt/clay range roads on the Eglin Range. No impacts to sensitive habitats are anticipated.

4.10.2 Alternative 1

Alternative 1 represents a minimization of the COMPTUEX from 9 days to 5 days. The daily intensity would be the same. Impacts to sensitive habitats from explosive and nonexplosive munitions would have a reduced occurrence given the lower number of days over which missions could occur. Given that sensitive habitats have a low risk of being affected under the Proposed Action, Alternative 1, with fewer days of activity, would have an even lower chance of affecting sensitive habitats. Impacts to sensitive habitats from wheeled and tracked vehicles would be the same as the Proposed Action. Thus, this alternative would have no significant impacts on sensitive habitats.

4.10.3 No-Action Alternative

There would be no impacts to sensitive habitats under the No-Action Alternative, which represents a continuation of baseline activities. Navy Pre-Deployment Training would not occur at Eglin AFB.

4.11 CULTURAL RESOURCES

The potential adverse effects due to physical disturbance and/or destruction of cultural resources are the focus of this analysis.

4.11.1 Proposed Action

Impacts from Aviation Operations

Aviation operations would not affect cultural resources.

Impacts from Munitions Use

Munitions would be used only in areas known to be devoid of cultural resources or in areas frequently used for munitions use. Some portions of active test areas contain high probability zones that are likely to contain archaeological sites. Explosive and nonexplosive bombing would avoid areas identified as containing cultural resources. Cultural resources are located between 300 and 5500 feet of the northernmost targets at TA C-72 (Figure 4-17). While 95 percent of munitions would be expected to land within 300 feet of targets, 5 percent would land within 5500 feet. Cultural resources near C-72 would have a remote possibility of impact from munitions if the northernmost targets were used. No potential for impact exists at TA C-52N or other explosive and nonexplosive test areas (Figures 4-18 and 4-19).

AAC/EMH is developing updated cultural resource constraint maps for the Eglin GIS, which would be available prior to the initiation of Navy Pre-Deployment Training. When complete, these maps would be consulted for any possible changes that would affect cultural resource analysis in this section.

Impacts from Tracked and Wheeled Vehicles

Tracked and wheeled vehicles would remain on roads and trails designated for their use. Thus, there would be no impact to cultural resources.

4.11.2 Alternative 1

Explosive ordnance use would avoid cultural resources. Targets are located sufficiently away from known cultural resources such that the occurrence of impact would be remote. Tracked and wheeled vehicles would remain on roads and trails designated for their use. Cultural resources would not be significantly affected.

4.11.3 No-Action Alternative

Baseline activities would occur under this alternative. Impacts to cultural resources would not occur.

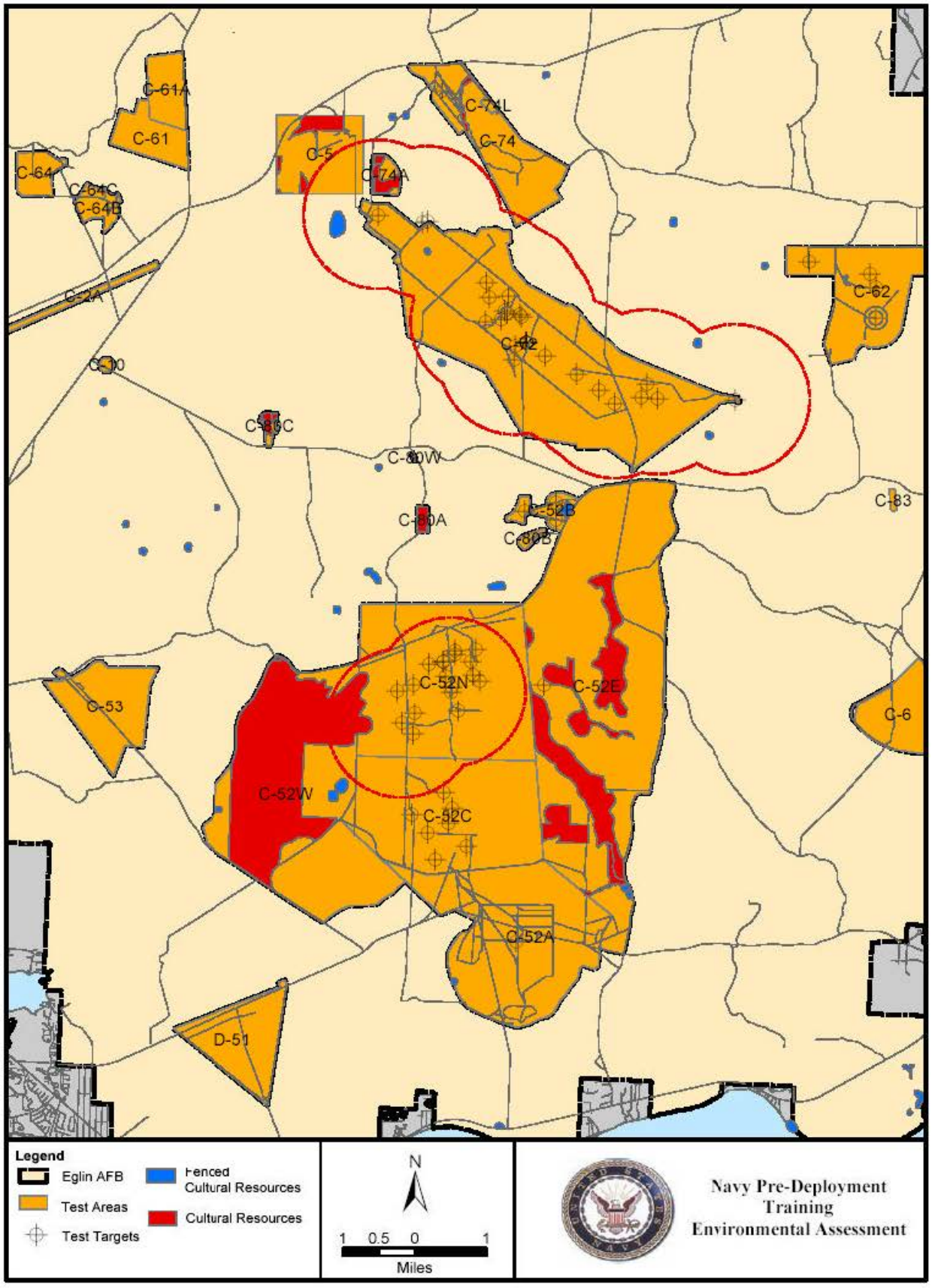

Figure 4-18. Potential Cultural Resource Impacts, TA C-52N and TA C-72

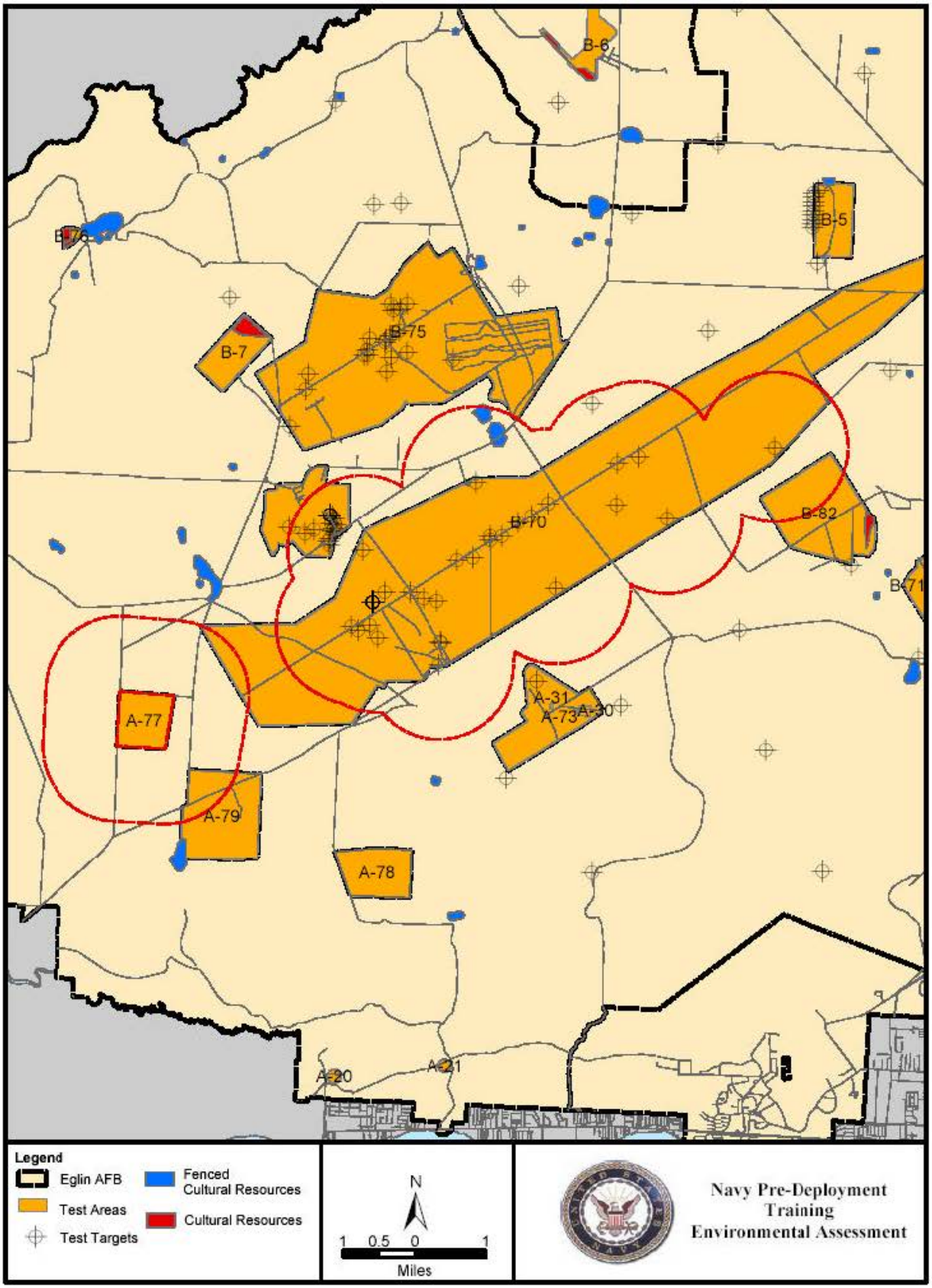

Figure 4-19. Potential Cultural Resource Impacts, TA A-77 and TA B-70

4.12 ENVIRONMENTAL JUSTICE AND THE PROTECTION OF CHILDREN

4.12.1 Proposed Action

Because the DoD has not directly or indirectly used criteria, methods, or practices that discriminate on the basis of race, color, or national origin to choose the sites where the COMPTUEXs and JTFEXs, would be conducted, and because, as explained elsewhere in this chapter, no significant impacts are expected to result from the Proposed Action, no disproportionate high or adverse impacts on minority or low-income communities are anticipated. Figures 4-20 and 4-21 illustrate average noise and single event noise levels, respectively, that would be produced under favorable weather conditions, which are explained in Section 4.2, Noise. Minority and low-income communities living near the reservation boundary are identified and overlaid with modeled noise contours to estimate disproportionate effects.

Under favorable weather conditions, the largest munitions detonated at TA C-52N and TA C-72 would not produce noise off-range greater than 115 dBP, a level that is identified by the U.S. Army to be potentially annoying to 15 percent of the population (U.S. Army, 2001). The largest munition that would potentially be detonated at TA A-77 is the Mk-82 and would produce noise greater than 115 dBP off the reservation. However, given the infrequent occurrence of the proposed training, there are no low-income or minority individuals or communities that would experience a disproportionate, adverse health, safety, or environmental impact from the execution of military missions within the proposed training areas.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, was signed on 21 April 1997. Because the scientific community recognized that children may suffer disproportionately from environmental health and safety risks, each federal agency is directed to identify and assess such risks and, consequently, to ensure that its policies, programs, activities, and standards address effects on children. *Environmental health and safety risks* are defined as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest." Covered regulatory actions that are affected by this EO are those substantive actions that concern an environmental health risk or safety risk that an agency has reason to believe may disproportionately affect children.

The proposed COMPTUEXs and JTFEXs would take place on training areas at Eglin AFB, which are located away from residential areas, schools, and playgrounds on base. Therefore, there would be no short or long-term impacts on the health and safety of children.

4.12.2 Alternative 1

The minimization of the COMPTUEX into a 5-day event would, like the Proposed Action, generate average daily noise off the reservation at levels considered by some to be annoying. However, these noise levels would not pose a health hazard and would not disproportionately affect the safety or environment of low-income or minority individuals.

The training areas would be located on Eglin AFB, away from residential areas, schools, and playgrounds such that no short or long-term health and safety impacts to children would occur.

4.12.3 No-Action Alternative

There would be no environmental justice impacts or impacts to children under this alternative. The baseline level of Eglin missions would continue.

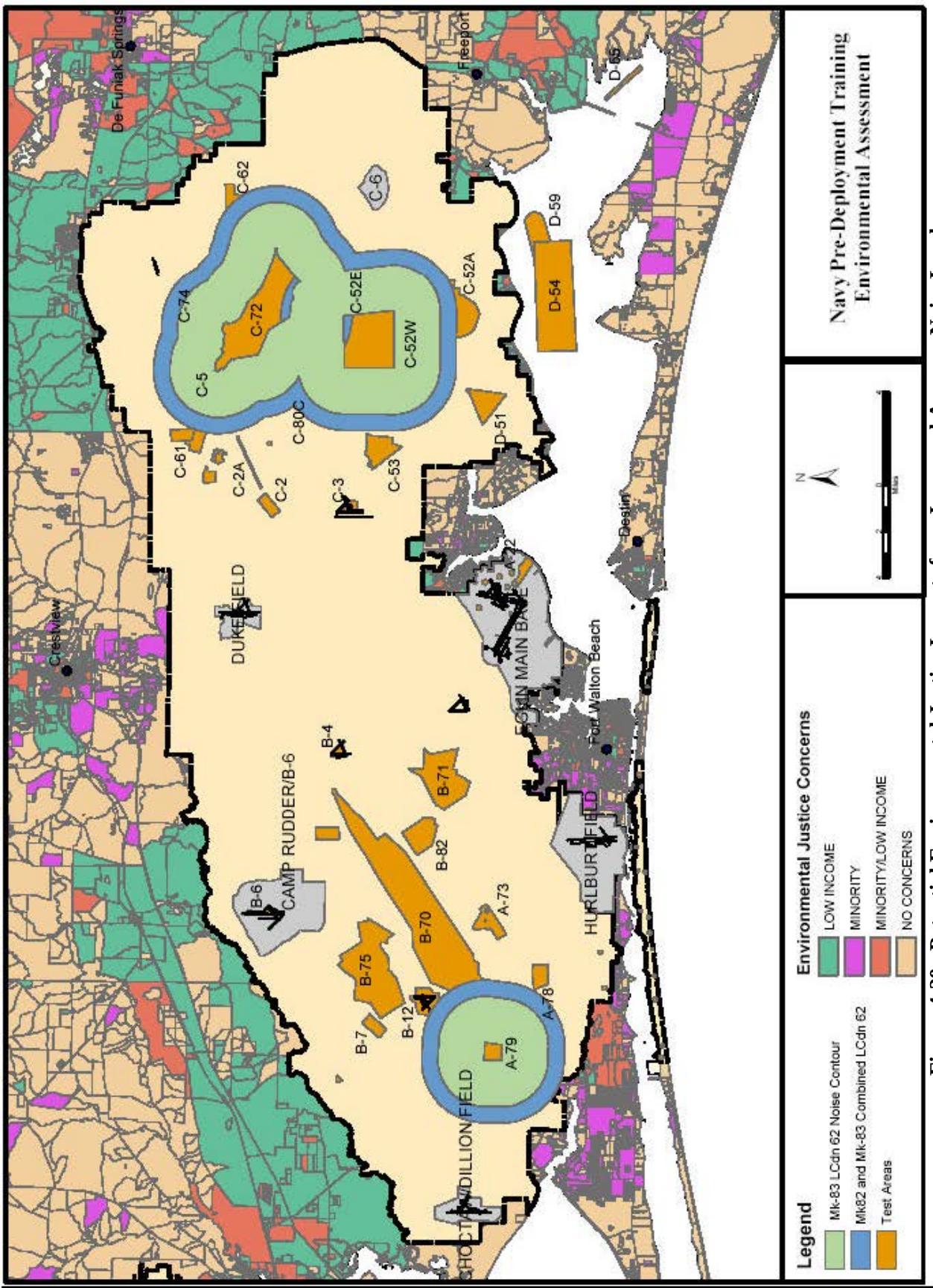

Figure 4-20. Potential Environmental Justice Impacts from Increased Average Noise Levels

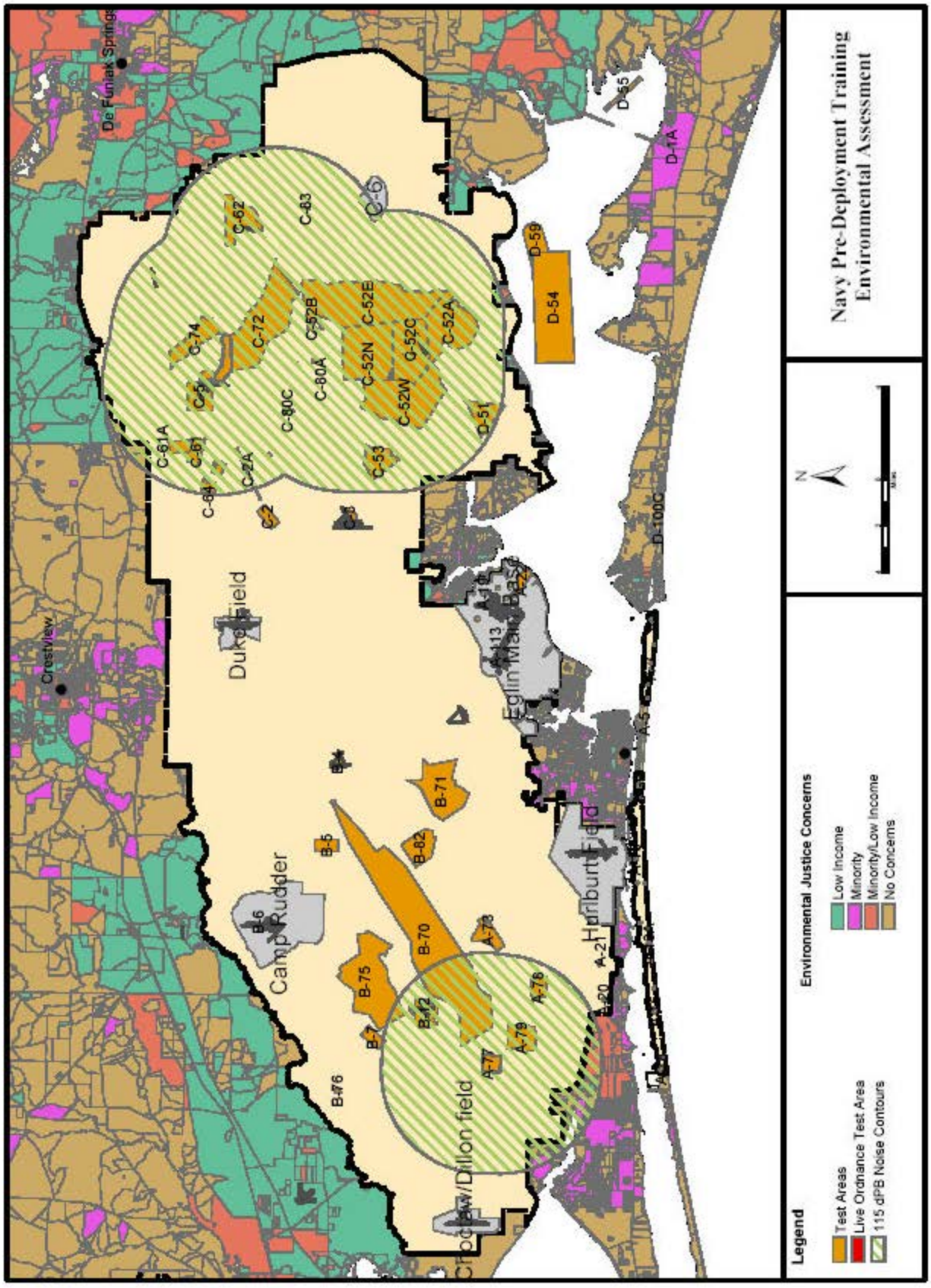

Figure 4-21. Potential Environmental Justice Impacts from Single -Event Bomb Noise

4.13 CUMULATIVE IMPACTS

The CEQ regulations for accomplishing NEPA (42 USC Sections 4321-4370d) define cumulative impacts as the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR 1508.7)."

Previous sections of Chapter 4, Environmental Consequences, considered the cumulative environmental impacts of the Proposed Action and Alternatives when added to the environmental impacts of other past and present actions. The cumulative environmental impacts of the proposed COMPTUEX/JTFEX training when added to other reasonably foreseeable future actions are considered in this section. NEPA regulations require a discussion of those cumulative impacts with the potential for significance. Since the Proposed Action occurs primarily on Eglin AFB, other reasonably foreseeable projects and missions on Eglin AFB, particularly those that are training-related, are the focus of this analysis.

4.13.1 Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Action

Amphibious Ready Group/Marine Expeditionary Unit Readiness Training. An environmental assessment entitled *Amphibious Ready Group/Marine Expeditionary Unit Readiness Training Final Environmental Assessment* was prepared in April 2003, resulting in a Finding of No Significant Impact. Training on Eglin AFB would be performed on water and land test and training ranges. Activities would occur no more than twice yearly and would not exceed a 10-day duration for an ARG/MEU event. The following events for ARG/MEU training would have cumulative impacts at the same test areas proposed for use in this environmental assessment.

Live Fire and/or Maneuver: Eight hundred Marines would conduct static live fire and/or live fire with maneuver into established live-fire areas. This force would operate on multiple ranges in groups of up to 135 troops. This event includes firing and maneuvering the M1A1, Amphibious Assault Vehicle (AAV), Land Assault Vehicle (LAV), High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), mounted Tube Launched, Optically Tracked, Wire Guided (TOW) missiles, heavy machine-gun vehicles, small arms, and tracers. Forces would sleep on their packs in the vicinity of firing ranges. Training duration would be for 72 hours and events would be once during 10-day training period. The types and amounts of munitions involved are detailed in Appendix H of the ARG/MEU environmental assessment.

> *Locations:* B-75, B-5, B-12, A-77, C-72, B-70, B-71, A-78, A-79, B-7, B-82, B-76, C-62, C-53, C-5, C-52, B-6 (for wheeled vehicle maneuvering)

Supporting Arms Coordination Exercise (SACEX): For this training event associated with ARG/MEU readiness training, 250 ground-based Marines call in live fire to an established munitions range. Marines travel in wheeled vehicles or by foot. Spotters, forward observers, and forward air controllers would employ laser rangefinders/designators in the impact area. Major weapon systems would include 60- and 81-mm mortars, 155-mm howitzers, AH-1W and UH-1N gunships, and fixed-wing aircraft (AV-8B and F/A-18). Initial training for ARG/MEU was to be performed on C-52. Training may take place at A-77 and A-78 in the future.

Navy Expeditionary Warfare Training (NEWT). NEWT includes activities similar to those proposed for ARG/MEU Readiness Training and SACEX live fire and maneuvers as described above and may be performed at Eglin in the near future.

Introduction of the V-22 Osprey. The Department of the Navy proposes to replace the CH-46 helicopter with a new generation weapons system called the V-22 Osprey. Introduction of the V-22 to the 2nd Marine Aircraft Wing at Marine Corps Air Station, New River, is expected to occur within the next few years. Future ARG/MEU training at Eglin would use the V-22 Osprey.

4.13.2 Potential Cumulative Impacts

Potential cumulative impacts from past, present, and future military actions are described below by resource. Non-military actions that may have a cumulative effect in conjunction with the Proposed Action are considered where applicable.

Socioeconomics

The Proposed Action, considered together with other training and testing activities on Eglin AFB would not result in cumulative impacts to the population, transportation, or restricted access. Training events would not change the area's population structure or dynamics. There would be no shift in employment trends as a result of the Proposed Action because no permanent new military activities would be occurring in the Eglin area. Individuals would not be prevented from accessing their property due to training events as all training would occur within the Eglin Range.

Noise

Noise impacts may be cumulative in the sense that the average ambient noise of an area could increase from several independent actions and the increased number of noise events of a particular kind (e.g., an explosion) from unrelated actions could result in an increased sensitivity of human receptors and therefore an increase in the number of complaints. The Proposed Action would produce noise that is similar to ongoing activities at Eglin AFB plus noise that is unique, particularly along some land-water interfaces.

The impact on the annual average noise of the Proposed Action was considered. Noise from bombs could represent a repetitive noise event that could, combined with other bomb noise from other missions, cause an increase in the number of complaints. To analyze this potential, the number of live bombs dropped over the past few years was considered in relation to the number of live bombs proposed for COMPTUEX/JTFEX training. The number of live bombs dropped at Eglin AFB varied from 290 in 1996 to 798 in 2000. Under the Proposed Action, 1,318 bombs are proposed for each 9-day event of which includes 284 of explosive bombs per year. This amount represents a 36 percent increase over the 2000 COMPTUEX/JTFEX conducted at Eglin or a 98 percent increase over the 1996 amount. Noise modeling and careful attention to weather conditions known to propagate (i.e., spread) noise minimized the effects of bomb noise from this first COMPTUEX/JTFEX on the community. Continuing these management practices for the Proposed Action and other training events involving live bombs would minimize potential cumulative effects such that there would be no significant impacts.

Safety

There would be no cumulative safety impacts from the Proposed Action. Activities would be coordinated and conducted concurrently and in the same vicinity with other test or training missions, following standard operating procedures. Future missions would have no bearing on the safety of the Proposed Action. Thus, there would be no combined safety concerns.

Wetlands

Presently other actions (i.e., training missions) occurring on Eglin AFB that take place in or near wetlands primarily involve foot traffic. Generally, all operational activities on Eglin AFB strive to avoid wetlands. There would be no cumulative impacts from the Proposed Action in combination with other current or future actions.

Floodplains and Coastal Zone

There would be no cumulative impacts to floodplains or the coastal zone. Historically, there has never been an issue with floodplains due to the conduct of missions on Eglin property. No inconsistencies with the state's Coastal Zone Management Plan have been identified for past missions.

Water Resources and Water Quality

Based on current chemical fate and transport literature and studies of ordnance from other gunnery ranges (Appendix A), constituents from ordnance may migrate to surface water and groundwater. Routine monitoring for contaminants in soil and groundwater is recommended along with range sustainability BMPs to assure that no adverse cumulative impacts to water resources are occurring at Eglin ranges from past, present, or future activities.

Air Quality

Cumulative air quality analysis considered all Eglin reportable emissions, which includes non-mission activities as well as mission actions and county totals. The potential contribution of air emissions from the Proposed Action was evaluated in Chapter 4 with respect to overall Eglin air emissions and county emissions and was found not to be significant. Thus, there are no significant cumulative impacts with respect to air quality.

Soils/Erosion

Potential cumulative soil quality impacts involve multiple or combined occurrences of spills, emissions, and by-products from past, present, and future actions, and the continuous deposition of solid debris, waste, or unexploded ordnance in test and training areas. Cumulative impacts from spills would not be significant as fueling operations do not occur on the test ranges. The potential cumulative impacts of all past, present, and future ordnance emissions and by-products, in combination with COMPTUEX/JTFEX training activities are difficult to assess. Best management practices, which include the activities outlined in the *Eglin Range UXO and Residue Strategic Plan* (U.S. Air Force, 2001b), are recommended.

The COMPTUEX, in addition to other training missions and proposed projects in which construction, land clearing, or road improvements play a major role could potentially result in cumulative soil/erosion impacts on Eglin AFB. Since all new mission projects have the potential to impact soils and/or may create erosion, best management practices should be adhered to in order to prevent cumulative impacts.

Hazardous Materials/Solid Waste

Potential cumulative Hazardous Materials/Solid Waste impacts involve multiple or combined occurrences of spills, emissions, and by-products from past, present, and future actions, and the continuous deposition of solid debris, waste, or unexploded ordnance in test and training areas. Cumulative impacts from spills would not be significant since Eglin AFB requires that all spills be reported and spill control personnel be on hand during fueling operations to control any spills that do occur. Cumulative impacts from waste products would not be significant since collection and proper disposal of wastes is mandatory for all actions in which such wastes would be produced. The potential cumulative impacts of all past, present, and future ordnance emissions and by-products, in combination with COMPTUEX/JTFEX training activities, is more difficult to assess. Clean-up of ordnance from Eglin ranges was shown to be <1.0 percent of the total expended items. Additional input of debris and UXO material may increase the amount of chemicals entering the soil. To prevent adverse cumulative impacts from hazardous materials on test areas, sampling of soil for contamination from ordnance and implementation range sustainability, and best management practices, which include the activities outlined in the *Eglin Range UXO and Residue Strategic Plan* (U.S. Air Force, 2001b), are recommended.

Restricted Access

The Proposed Action would not have combined restricted access impacts. The roads into live-fire test ranges are normally kept closed at all times. Access through the range gates is controlled through the Range Operations Control Center (ROCC) and a Z-clearance authorization number or mission number is required. Similar training activities such as the ARG/MEU Readiness Training that may encompass air-dropped ordnance may expand or activate safety footprints not regularly used.

Sensitive Species

Observance of management requirements would minimize the extent of adverse impacts. Close monitoring of species' numbers on Eglin AFB and continued coordination of the Air Force with federal agencies regarding sensitive species would ensure that no significant cumulative impacts occur.

Sensitive Habitats

Observance of management requirements would minimize the extent of adverse impacts. Close monitoring of sensitive habitat on Eglin AFB and continued coordination of the Air Force with federal agencies regarding sensitive species habitat would ensure that no significant cumulative impacts occur.

Cultural Resources

All past, present, and future projects that would be potentially impactive to cultural resources would have undergone or would undergo a Section 106 review and, as necessary, would be mitigated. Thus, the Proposed Action, in conjunction with other projects, would not have significant cumulative impacts.

Environmental Justice

The Proposed Action, in combination with other training missions on Eglin AFB, would not result in cumulative environmental justice effects. No disproportionate high or adverse impacts on minority or low-income communities are anticipated. The COMPTUEX/JTFEX would take place on training areas within test ranges on Eglin AFB, which are located away from residential areas, schools, and playgrounds. Therefore, there would be no short or long-term impacts on the health and safety of children.

5. PLANS, PERMITS, AND MANAGEMENT REQUIREMENTS

5.1 SOCIOECONOMICS

5.1.1 Population and Economy, Employment, Tourism

No permits, plans, or management requirements are required.

5.1.2 Restricted Access

No permits or plans are required.

Management Requirements

The Proponent would implement the following management requirements.

- Road barriers and the posting of signs would identify restricted access areas.
- If nonmilitary personnel were to enter into, or near, a landing zone, training activity would simply cease until the area was cleared.
- Notify the media. The AAC Public Affairs Office would make advanced notifications to the media. Access to closed areas is permitted to military personnel, civil servants, and contractors if a Z-clearance has been granted by Range Operations Control Center.
- Advanced scheduling of COMPTUEX/JTFEX Training events at Eglin would allow the greatest flexibility in terms of public notification of restricted access and closures. As soon as scheduling the events was feasible, coordination with the Public Affairs and Natural Resources Branch of Eglin would be required to ensure dissemination of restricted access and closure information.

5.1.3 Environmental Justice

No permits, plans, or management requirements are required.

5.2 NOISE

No permits or plans are required.

Management Requirements

Management requirements for noise include measures to minimize and reduce the noise or provide public notification. The Proponent would implement the following management requirements.

- Provide advance notification of training exercises to the public.
- Conduct real-time noise modeling to incorporate the noise propagating effects of current weather conditions to manage bombing and artillery events.

5.3 SAFETY

Plans

Safety Appendix to the Navy Pre-Deployment Training Test Directive according to AACI 91-201

Permits

No permits are required.

Management Requirements

The Proponent would implement the following management requirements.

- Existing fire management protocols would be observed.
- Safety footprints would be required for all explosive munitions use.
- In accordance with Eglin AFB's current method of operation, AAC/SE would determine the risk from UXO and employ control measures based on an informal analysis of the action and the risk factors.

5.4 HAZARDOUS MATERIALS/SOLID WASTE

5.4.1 IRP

No permits, plans, or management requirements are required.

5.4.2 Hazardous Materials/Waste

No plans or permits are required.

Management Requirements

The Proponent would implement the following management requirements.

- Immediate response is required for petroleum, oil, and lubricant (POL) spills. Appropriate containment and clean-up actions, including on-base reporting requirements and disposal, are required. POL products cannot be directed to sewer systems or impervious surfaces (such as grass). Spill response kits (pads and boons) would be made available during refueling activities.
- All spills and accidental discharges of petroleum, oils, lubricants, chemicals, hazardous waste, or hazardous materials, regardless of the quantity, would be reported. A Spill Discharge Report must be filled out, and the responsible party must hand-carry or fax (882-3761) this Spill Report to AAC/EMCE, within four duty hours of the spill occurrence. Any spill that poses a threat to life, health, environment, or has the potential

to cause a fire, would be reported to 96 CEG/CESF via 96 SFS by dialing 911. If the Fire Department declares an emergency condition, they may take control of the situation, including the tasking of the organization's clean-up detail. Spills over 25 gallons are required to be reported to the Florida Department of Environmental Protection (through AAC/EMCE).

- Off-base notification of spills would be reported to Eglin Public Affairs Office (AAC/PA) at (850) 882-3931.
- The Proponent would comply with AAC Plan 32-9 Hazardous Materials Management.

Recommended Best Management Practices for Range Sustainment – Soil, Surface Water, and Groundwater Quality Impacts from Munitions Residue

- Runoff control through the use of vegetative ground cover, mulches and compost, surface covers, and engineered runoff controls.
- Recovery of munition casings from streams, wetland areas, and interior objectives, when possible.
- Use of munitions composed of non-lead alloys, when possible.
- Recovery of approximately 60 percent of the brass casings expended during training.
- Proactive monitoring for potential migration of metals and explosives.
- Avoidance of deposition of casings and other materials into sensitive species' habitats.

5.5 SENSITIVE SPECIES

Plans

No plans are required.

Permits

An informal consultation with the USFWS is required and would be completed prior to training date.

Management Requirements

- Use of TT-85 on TA C-72 for the Mk-80 series munitions would potentially result in adverse noise effects to the RCW colony northwest of this target. Therefore this target would not be used for Mk-80 series bombing.
- In the event a munition does directly impact a darter stream, Eglin Natural Resources personnel should be contacted to advise in the removal operations.
- USFWS consultation may yield additional requirements not yet specified.

5.6 SENSITIVE HABITATS

Plans

No plans are required.

Permits

An informal consultation with the USFWS for potential impacts to habitats of threatened and endangered species is required and would be completed prior to training date.

Management Requirements

- Consultation with the USFWS may yield sensitive habitat management requirements.
- To minimize the potential for wildfires from Navy Pre-Deployment Training, the Proponent would coordinate with the Resource Scheduling and Operational Management System (RESOMS) to verify wildfire condition status.
- The Proponent would consult Eglin's Wildfire Specific Action Guide Restrictions to manage explosive ordnance use as appropriate with respect to fire index conditions.

5.7 CULTURAL RESOURCES

Plans

No plans are required.

Permits

A consultation with the State Historic Preservation Office is in process and would be complete prior to training date.

Management Requirements

No new management requirements are being developed.

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7. LIST OF PREPARERS

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Name/Qualifications	Contribution	Experience
Kevin Akstulewicz Environmental Scientist B.S. Environmental Science/Policy	Author	7 years environmental science
William Brown Environmental Engineer/ GIS Specialist B.S. Civil Engineering M.S. Civil and Environmental Engineering	Analyst	13 years as environmental professional, Computer Modeling, Statistical Analysis
Catherine Brandenburg Document Production	Document Production	4 years experience
Kevin Ironside Division Manager M.S. Environmental Toxicology B.A. Microbiology	Project Manager	19 years environmental science
W. James McKee Environmental Scientist B.S. Marine Biology	Author	19 years environmental science
Michael Nation Environmental Scientist B.S. Environmental Science/Policy, Minor in Geography; A.A. General Science	GIS	3 years experience as an environmental consultant; Interagency Coordination; GIS Arc View applications
Diana O'Steen Document Management Specialist	Document Production	14 years experience in document management
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Kathryn Tucker Environmental Toxicologist M.S. Biological Sciences (Toxicology) B.S. Environmental Health Sciences	Author	9 years environmental science
Tara Utsey Technical Editor	Editor	5 years experience in editing and 10 years in document production
William Wuest M.S. Public Administration B.S. Political Science	Author	38 years noise and DoD experience

APPENDIX A

CHEMICAL FATE AND TRANSPORT AND TOXICITY ASSESSMENT OF ORDNANCE

Table A-1. Chemical Fate and Transport and Toxicity Assessment Metals in Ordnance

Chemical/USEPA Carcinogenicity Class	Environmental Fate and Transport	Toxicity
Aluminum D-Not classifiable	Aluminum occurs naturally in soil and water and cannot be broken down in the environment. Wind-borne particles settle to the ground or are washed out of the air by rain. Aluminum in soil is taken up into plants; however, it not known to bioconcentrate in the food chain. An exception is tea plants, which can accumulate aluminum. Most aluminum-containing compounds do not dissolve in water unless the water is acidic. When acid rain falls, aluminum compounds in the soil may dissolve and enter lakes and streams. Since the affected bodies of water are often acidic themselves from the acid rain, the dissolved aluminum does not combine with other elements in the water and settle out as it would under normal (i.e., nonacidic) conditions (ATSDR, 1999a).	Low-level exposure to aluminum from food, air, water, or contact with skin is not thought to harm health. People who are exposed to high levels of aluminum in air may have respiratory problems including coughing and asthma from breathing dust. Some studies show that people with Alzheimer's disease have higher levels of aluminum in their brains. Infants and adults who received large doses of aluminum developed bone diseases (ATSDR, 1999a). Laboratory studies with rats and rabbits showed that aluminum dust caused adverse effects to the respiratory system, spleen, kidneys, and blood vessels. Ingestion of 1,400 mg/kg showed effects to blood and bone. Chickens developed rickets (TOXNET, 2002).
Chromium Chromium(VI) in air A-Human carcinogen	Chromium(III) occurs naturally in the environment and is an essential nutrient. Chromium(VI) and chromium(0) are generally produced by industrial processes. In air, chromium compounds are present mostly as fine dust particles (chromium(III) and chromium(VI) forms). Although most of the chromium in water binds to dirt and other materials and settles to the bottom, a small amount may dissolve in the water. Fish do not accumulate much chromium in their bodies from water. Most of the chromium in soil does not dissolve easily in water and can attach strongly to the soil. A very small amount of the chromium in soil, however, will dissolve in water and can move deeper in the soil to underground water (TOXNET, 2003).	Chromium(III) is an essential nutrient. Breathing high levels of chromium(VI) can cause irritation the nasopharyngeal airway. Ingestion of large amounts of chromium(VI) can cause adverse effects to the stomach to include ulcers, convulsions, kidney and liver damage, and even death. Skin contact with certain chromium(VI) compounds can cause skin ulcers. Some people are extremely sensitive to chromium(VI) or chromium(III). Allergic reactions consisting of severe redness and swelling of the skin have been noted (ATSDR, 2003). Several studies have shown that chromium(VI) compounds can increase the risk of lung cancer. Animal studies have also shown an increased risk of cancer.

Table A-1. Chemical Fate and Transport and Toxicity Assessment Metals in Ordnance Cont'd

Chemical/USEPA Carcinogenicity Class	Environmental Fate and Transport	Toxicity
Copper D-Not classifiable	Copper can enter the environment on military ranges from the corrosion of brass weaponry or small arms ammunition. Copper is also found naturally in the environment. The majority of copper released to soils becomes bound to soils or organic matter. Much of the copper discharged into waterways is in particulate matter and settles out, precipitates out, or adsorbs to organic matter, hydrous iron and manganese oxides, and clay in sediment or in the water column. A significant fraction of the copper is adsorbed within the first hour, and in most cases, equilibrium is obtained within 24 hours. Copper binds primarily to organic matter in estuarine sediment, unless the sediment is organically poor. The ability of copper to leach from soils is dependent upon the acidic content of rainfall through the soil (ATSDR, 1990). One study showed that copper became mobile only following rainfall that was acidic at a pH of <3. Thus the primary transport pathway of copper would be from leaching through the acidic to slightly acidic permeable sandy soils. Because copper binds so strongly to suspended particles and sediments, it typically does not enter groundwater. Because copper adsorbs to organic matter, carbonates, and clay in the environment, its bioavailability is reduced.	Copper is essential to human health but ingesting gram doses of copper salts has resulted in gastrointestinal, liver, and bladder effects. Gastrointestinal disturbance and liver toxicity have resulted in long-term exposure to drinking water containing 2.2-7.8 mg/L. Workers exposed to copper dust experienced gastrointestinal problems, headaches, and vertigo (ATSDR, 1990). Copper sulfate and other copper compounds are used as algaecides with the free copper ions acting as the lethal agents. Single-cell and filamentous algae and cyanobacteria are very susceptible to the effects, which include reductions in photosynthesis and growth, loss of photosynthetic pigments, and death. Sensitive algae can be affected at low concentrations of free copper in freshwater. It is highly toxic to fish and has been lethal to trout even at recommended applications. Copper is acutely toxic to a variety of freshwater species ranging from sensitivities of 17.74 µg/L for pike minnow species to 10,240 µg/L for stonefly species (USEPA, 1986). In laboratory studies, animals exposed to copper showed liver and kidney death at doses > 100 mg/kg/day. Copper has been shown to be poisonous to terrestrial organisms in soil (e.g., earthworms). Extensive use of copper-containing fungicides in orchards has been known to eradicate soil organisms (TOXNET, 2003). Copper sulfate is fairly nontoxic to birds, with the lowest lethal dose shown at 1,000 mg/kg in pigeons and 600 mg/kg in ducks. The bioconcentration factor (BCF) of copper in fish obtained in field studies is 10–100, indicating a low potential for bioconcentration. The BCF is higher in mollusks, especially oysters, where it may reach 30,000 possibly due to the fact that they are filter feeders, and copper concentrations are higher in particulates than in water. However, there is abundant evidence that there is no biomagnification of copper in the food chain (ATSDR, 1990).

Table A-1. Chemical Fate and Transport and Toxicity Assessment Metals in Ordnance Cont'd

Chemical/USEPA Carcinogenicity Class	Environmental Fate and Transport	Toxicity
Lead Compounds B2-Probable human carcinogen	Lead oxidizes when exposed to air and dissolves when exposed to acidic water and soil. Lead bullets, bullet particles, or dissolved lead can be moved by stormwater runoff, and dissolved lead can migrate through soils to the groundwater. The primary cause of lead mobilization from ammunition is from metallic lead to form Pb^{+2} (dissolved from the crust of ammunition) and a combination of oxidized compounds. Acidic soils tend to increase lead oxidation and dissolution (ATSDR, 1999b). The downward movement of elemental lead and inorganic lead compounds from soil to groundwater by leaching is very slow under most natural conditions except for highly acidic situations. Soils low in clay (sandy), containing organic matter, iron, and aluminum oxides, and acidic soils, all provide conditions favorable to lead mobility and leachability. Plants and animals may bioconcentrate lead. Lead partitions primarily to sediments but becomes more bioavailable under low pH, hardness, and organic matter content (among other factors). Lead bioaccumulates in algae, macrophytes and benthic organisms, but the inorganic forms do not biomagnify (ATSDR, 1999).	Lead is cancer-causing and adversely affects reproduction, liver and thyroid function, and disease resistance. Plants and animals may bioconcentrate lead but biomagnification has not been detected (ATSDR, 1999b). Fish exposed to high levels of lead have shown muscular and neurological degeneration and destruction, growth inhibition, death, reproductive problems, and paralysis. Birds and mammals suffer effects from lead poisoning such as damage to the nervous system, kidneys, liver, sterility, growth inhibition, developmental retardation, and detrimental effects in blood (USEPA, 2003). Lead poisoning in higher organisms has been associated with lead shot and organolead compounds. The main potential ecological impacts of the wetland contaminants result from direct exposure of algae, benthic invertebrates, and embryos and fingerlings of freshwater fish and amphibians to lead. Potential endpoints include growth reductions and impaired survival (USEPA, 2003). In the form of simple salts, lead is acutely toxic to freshwater organisms at concentrations above 40 mg/L and for marine organisms above 500 mg/L (WHO, 1989). Calves pastured on a target area of a military shooting range showed acute lead poisoning that included symptoms of maniacal movements, drooling, rolling eyes, and convulsions. Most calves died, and blood levels of lead were as high as 940 µg/L. Concentrations of lead in the grass and soil were 29,550 mg/kg and 3,900 mg/kg, respectively (Braun, et al., 1997). Birds including fowl, ducks, geese and pigeons are all prone to lead poisoning. All exhibit anorexia and ataxia, followed by excitement and loss of function. Egg production, fertility, and hatchability decrease and mortality is high (TOXNET, 2003). Lead shot is highly toxic to birds; ingestion of a single pellet can be fatal to some birds (WHO, 1989).

Table A-1. Chemical Fate and Transport and Toxicity Assessment Metals in Ordnance Cont'd

Chemical/USEPA Carcinogenicity Class	Environmental Fate and Transport	Toxicity
TNT C-Possible human carcinogen	TNT does not readily hydrolyze or volatilize from water under normal environmental conditions. It migrates slowly through soil and binds to sediments and particulates in the water column. Studies have shown that photochemical reactions of TNT may play an important role in surface soil and water degradation. Microbial degradation showed longer half-lives than photolysis. The half-life was 3 to 4 days in sediment exposed to sunlight and 19 to 25 days when undergoing microbial degradation (TOXNET, 2002).	Human health effects have been recorded from workers involved in the production of TNT at their jobs. Harmful effects include disorders of the blood such as anemia and abnormal liver function. Prolonged exposure to the skin can cause allergic reactions, itching and rashes. Long-term exposure to TNT has caused cataracts in some individuals. Based on laboratory animal studies showing urinary bladder tumors, TNT had the potential to be a possible human carcinogen. Studies with rats, mice, and dogs showed effects to the male reproductive system, heart, blood, and urinary bladder. Studies with the northern bobwhite quail showed an acute lethal dose of 2,003 mg/kg. Adverse effects were seen in the blood cells, liver, urine, and heart (Gogal et al., 2002). Fathead minnow showed behavioral effects when exposed to 0.46 mg/L TNT. In a laboratory microcosm study using daphnid, zooplankton, worms, and algae, exposures of 21 days at = 5.6 mg/L produced reductions in daphnid and worms. Exposure of TNT at concentrations of 0.24 to 1.69 mg/L for 60 days reduced fish fry survival, and concentrations of 0.04 to 0.5 mg/L reduced length and weight of fry (TOXNET, 2002).
RDX C-Possible Human Carcinogen	RDX will be moderate to highly mobile in soil and will break down (biodegrade) under anaerobic conditions, exhibiting a half-life of 12 days. It remains resistant to degradation when exposed to air (aerobic). If released to the atmosphere, RDX will exist as particulate and ultimately be removed by dry deposition. In water, RDX exhibits direct photochemical breakdown, as it does in the atmosphere (Hoffsommer et al., 1972).	Occupational exposure has caused toxic effects to the central nervous system to include tonic/clonic seizures. Chronic exposure caused convulsions, headache, nausea, vomiting, and unconsciousness. Based on laboratory animal studies showing development of liver tumors, it is thought that RDX may cause cancer in humans. Laboratory studies with mice revealed the central nervous system, kidney, liver, spleen, heart, eyes, and testicles were affected. Freshwater fish are more susceptible to RDX than invertebrates. The lethal concentration to kill 50% (LC_{50}) of the fish ranged from 4.1 to 13 mg/L, depending on the test system (IRIS, 2002). Studies of the northern bobwhite quail established a no observable adverse effect level (NOAEL) of 8.7 mg/kg and lowest observable effect concentration (LOAEL) of 10.6 mg/kg. Effects to blood, spleen, and egg production were noted (USCHPPM, 2002).

Table A-1. Chemical Fate and Transport and Toxicity Assessment Metals in Ordnance Cont'd

Chemical/USEPA Carcinogenicity Class	Environmental Fate and Transport	Toxicity
Zinc B2-Probable human carcinogen	Zinc is not found in free form in nature but rather occurs as zinc sulfide or zinc oxide. As with copper, zinc can enter the Eglin environment from corrosion of brass weaponry or small arms. When released to the air it can bind to soil, sediments, and dust particles. Zinc ions and zinc complexes can migrate to groundwater and move to surface waters. Most of the zinc in soils stays bound to soil particles. Neutral soils between pH of 6 and 7 reduce the availability of zinc to soils. Zinc has been shown to bioaccumulate in fish and other organisms; however, it does not bioaccumulate in plants (ATSDR, 1995).	Zinc is a nutritionally essential element. However, acutely toxic doses (675 to 2,280 µg/L) in drinking water cause nausea, vomiting, diarrhea and abdominal cramps. Gastric bleeding and anemia were seen from individuals taking zinc sulfate (6.47 mg/kg/day) for one week. Ingestion of zinc chloride has caused burning in the mouth and throat, vomiting, pharyngitis, esophagitis, hypocalcaemia, and pancreatitis. Long-term oral doses have caused anemia (ATSDR, 1995). The acute toxic effects of zinc have been observed in the field and laboratory. Sheep consuming zinc (dose unknown) as a result of environmental contamination, developed diarrhea, protein in the urine, intestinal and pancreatic lesions and pancreatic cell degeneration. Ferrets dosed with 850 mg/kg/day showed adverse effects to the kidneys, intestines, and blood. The aquatic toxicity of zinc is dependent upon organism age, size, prior exposure, water hardness, pH, dissolved organic carbon, and temperature. Reported acute toxicity values of dissolved zinc to freshwater and marine organisms are as follows: freshwater invertebrates (0.07 mg/L), water flea (575 mg/L), marine invertebrates (0.097 mg/L), grass shrimp (11.3 mg/L). Acutely lethal concentrations for freshwater fish range from 0.066 to 2.6 mg/L; the range for marine fish is 0.19 to 17.66 mg/L (USEPA, 1980). Zinc has shown adverse reproductive, biochemical, physiological, and behavioral effects on aquatic organisms.

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APPENDIX B

PUBLIC REVIEW PROCESS

PUBLIC REVIEW PROCESS

Materials pertaining to the public review process are presented in this section, including the public notification of the availability of the Draft Navy Pre-Deployment Training Environmental Assessment and comments received from members of the public.

B-1 Public Notification Statement

The following public notification statement was posted in the Fort Walton Daily News newspaper.

PUBLIC NOTIFICATION

In compliance with the National Environmental Policy Act, Eglin Air Force Base announces the availability of a draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for RCS 03-811 Navy Pre-Deployment Training for public review and comment.

The Proposed Action of RCS 03-811 is to conduct Navy Pre-Deployment Training consisting of up to two Composite Training Unit Exercises (COMPTUEXs) and three advanced-phase Joint Task Force Exercises (JTFEXs) at Eglin AFB per year. The COMPTUEX and JTFEX would not necessarily be conducted concurrently. COMPTUEX training would require nine days of Eglin Range operations over a 10-calendar day period, with the majority of operations occurring during the second week. JTFEX would require three days of Eglin Range operations over a 3-calendar day period. Years in which two COMPTUEXs occur would require two 9-day periods of range operations; likewise, JTFEXs would require up to three 3-day periods of range operations. It is possible that the training would occur only once during some years and not at all in others.

Your comments on this Draft Navy Pre-Deployment Training EA are requested. Letters or other written or oral comments provided may be published in the Final Navy Pre-Deployment Training EA. As required by law, comments will be addressed in the Final Navy Pre-Deployment Training EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the Final Navy Pre-Deployment Training EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final Navy Pre-Deployment Training EA. However, only the names and respective comments of respondent individuals will be disclosed. Personal home addresses and phone numbers will not be published in the Final Navy Pre-Deployment Training EA.

Copies of the Environmental Assessment and Finding of No Significant Impact (FONSI) may be reviewed at the Fort Walton Beach Public Library, 185 SE Miracle Strip Parkway, Fort Walton Beach, Florida; Destin Public Library, 150 Sibert Avenue, Destin, Florida; and the Niceville Library, 100 Armstrong Avenue, Niceville, Florida; Navarre Public Library, 8484 James M. Harvell Road, Navarre; Robert L.F. Sikes Library, 1445 Commerce Drive, Crestview. Copies will be available for review from January 19, 2004 through February 3, 2004. Comments must be received by February 6, 2004.

For more information or to comment on these proposed actions, contact:

Commander, Atlantic Division, Naval Facilities Engineering Command, Attn: Jim Seyler Code BD32JS, 6506 Hampton Blvd, Norfolk, VA 23508-1278 or email: james.seyler@navy.mil, Tel: (757) 322-4842.

Locally, contact Mr. Mike Spaits, AAC/EM-PAV, Tel: (850) 882-2878 ext. 333.

B-2 Public Comments

No public comments were received during the public review period.

APPENDIX C

COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION AND FLORIDA STATE CLEARINGHOUSE COMMENTS

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

February 2, 2004

Mr. Stephen M. Seiber, Chief
Natural Resources Branch
ACC/EMSN
501 DeLeon Street, Suite 101
Eglin AFB, Florida 32542-5133

RE: Department of the Air Force – Preliminary Draft Environmental Assessment – Navy Pre-Deployment Training at Eglin Air Force Base – Santa Rosa, Okaloosa, and Walton Counties, Florida.
SAI # FL200401054986C

Dear Mr. Seiber:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the referenced preliminary draft environmental assessment (EA).

Based on the information contained in the EA and comments provided by our reviewing agencies, the state has determined that the subject federal action is consistent with the Florida Coastal Management Program.

Thank you for the opportunity to review this project. If you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2163.

Sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm
Enclosures

"More Protection, Less Process"

Printed on recycled paper

Feb 02 04 01:21p AAC/EMSN 8508835321 p.4

Project Information	
Project:	FL200401054986C
Comments Due:	February 03, 2004
Letter Due:	February 20, 2004
Description:	DEPARTMENT OF THE AIR FORCE - PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT - NAVY PRE-DEPLOYMENT TRAINING AT EGLIN AIR FORCE BASE - SANTA ROSA, OKALOOSA, AND WALTON COUNTIES, FLORIDA.
Keywords:	USAF - NAVY PRE-DEPLOYMENT TRAINING AT EGLIN AFB
CFDA #:	12.200

Agency Comments:
WALTON -
WEST FLORIDA RPC - WEST FLORIDA REGIONAL PLANNING COUNCIL
No Comments - Generally consistent with the Strategic Regional Policy Plan
OKALOOSA - OKALOOSA COUNTY
SANTA ROSA - SANTA ROSA COUNTY
ENVIRONMENTAL POLICY UNIT - OFFICE OF POLICY AND BUDGET, ENVIRONMENTAL POLICY UNIT
No Comment
COMMUNITY AFFAIRS - FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS
Released Without Comment
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
NO COMMENT BY BRIAN BARNETT
STATE - FLORIDA DEPARTMENT OF STATE
No Comment
TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION
Released Without Comment
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
No Comment
NORTHWEST FLORIDA WMD - NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
No Comment

For more information please contact the Clearinghouse Office at:

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

Visit the Clearinghouse Home Page to query other projects.

Feb 02 04 01:21p AAC/EMSN 8508835321 p.5
02/02/2004 13:18 8502452136 FL SI CLEARINGHSE PAGE 04/07

COUNTY: ALL

DATE: 12/22/2003
COMMENTS DUE DATE: 2/3/2004
CLEARANCE DUE DATE: 2/20/2004
SAI#: FL200401054986C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RFCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
X FISH and WILDLIFE COMMISSION			
STATE			
TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

- Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.
- X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.
- Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.
- Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE AIR FORCE - PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT - NAVY PRE-DEPLOYMENT TRAINING AT EGLIN AIR FORCE BASE - SANTA ROSA, OKALOOSA, AND WALTON COUNTIES, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA
- ☑ No Comment
- ☐ Comment Attached
- ☐ Not Applicable

Federal Consistency
- ☑ No Comment/Consistent
- ☐ Consistent/Comments Attached
- ☐ Inconsistent/Comments Attached
- ☐ Not Applicable

From:
Division/Bureau: ENVIRONMENTAL SERVICES
Reviewer: BRIAN BARNETT
Date: 12/7/04

RECEIVED BY FWC
JAN 06 2004
OFFICE OF ENVIRONMENTAL SERVICES

RECEIVED
JAN 08 2004
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Feb 02 04 01:21p AAC/EMSN 8508835321 p.6
02/02/2004 13:18 8508352198 FL ST CLEARINGHSE PAGE 05/07

COUNTY: ALL
SAI-FLA-EG
2004-00037

DATE: 12/22/2003
COMMENTS DUE DATE: 2/3/2004
CLEARANCE DUE DATE: 2/20/2004
SAI#: FL200401054986C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
X STATE			
TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

- Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.
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- Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE AIR FORCE - PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT - NAVY PRE-DEPLOYMENT TRAINING AT EGLIN AIR FORCE BASE - SANTA ROSA, OKALOOSA, AND WALTON COUNTIES, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA
☑ No Comment
☐ Comment Attached
☐ Not Applicable

Federal Consistency
☑ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:
Division/Bureau: Division of Historical Resources / Bureau of Historic Preservation
Reviewer: S. Eichmann Laura A. Kammerer, Supervisor
Date: 1-20-04 1-20-2004
SHPO / FL#4271

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JAN 22 2004
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Feb 02 04 01:21p AAC/EMSN 8508835321 P.7

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COUNTY: ALL

DATE: 12/22/2003
COMMENTS DUE DATE: 2/3/2004
CLEARANCE DUE DATE: 2/20/2004
SAI#: FL200401054986C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
COMMUNITY AFFAIRS	NORTHWEST FLORIDA WMD	X ENVIRONMENTAL POLICY UNIT	
ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
STATE			
TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

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- Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE AIR FORCE - PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT - NAVY PRE-DEPLOYMENT TRAINING AT EGLIN AIR FORCE BASE - SANTA ROSA, OKALOOSA, AND WALTON COUNTIES, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA Federal Consistency

- ☑ No Comment
- ☐ Comment Attached
- ☐ Not Applicable
- ☐ No Comment/Consistent
- ☐ Consistent/Comments Attached
- ☐ Inconsistent/Comments Attached
- ☐ Not Applicable

From:
Division/Bureau: OIP. Env. Policy
Reviewer: M. J. Ogorzalek
Date: 1/23/04

RECEIVED
JAN 28 2004
OIP/OLGA

RECEIVED
JAN - 6 2004
OFFICE OF POLICY AND BUDGET
ENVIRONMENTAL POLICY UNIT

APPENDIX D

STATE HISTORIC PRESERVATION OFFICE CONSULTATION

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FLORIDA DEPARTMENT OF STATE
Glenda E. Hood
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Maria D. Rodriguez
Chief, Historic Preservation Division
Department of the Air Force
501 DeLeon Street, Suite 101
Eglin Air Force Base, Florida 32542-5101

January 15, 2004

RE: DHR Project File Number: 2004-271
Received by DHR January 14, 2004
U.S. Navy Pre-Deployment Training - Composite Training Unit Exercises (COMPTUEX) and Advanced-Phase Joint Task Force Exercises (JTFEX)
Eglin Air Force Base

Dear Ms. Rodriguez:

Our office received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*. The State Historic Preservation Officer is to advise Federal agencies as they identify historic properties (listed or eligible for listing, in the *National Register of Historic Places*), assess effects upon them, and consider alternatives to avoid or minimize adverse effects.

Based on the information provided, this office concurs with the finding that the proposed undertaking will have no effect on historic properties.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail *sedwards@dos.state.fl.us*, or at 850-245-6333 or 800-847-7278.

Sincerely,

Laura A. Kammerer, Supervisor

for Frederick Gaske, Acting Director, and
Deputy State Historic Preservation Officer

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6435
☐ Archaeological Research (850) 245-6444 • FAX: 245-6436
☑ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433
☐ Palm Beach Regional Office (561) 279-1475 • FAX: 279-1476
☐ St. Augustine Regional Office (904) 825-5045 • FAX: 825-5044
☐ Tampa Regional Office (813) 272-3843 • FAX: 272-2340

APPENDIX E

SECTION 7 U.S. FISH AND WILDLIFE SERVICE INFORMAL CONSULTATION

Mr. Stephen M. Seiber 9 Jan 03
Chief, Natural Resources Branch
501 DeLeon Street, Suite 101
Eglin AFB FL 32542-5133

Ms Gail Carmody
US Fish and Wildlife Service
1612 June Avenue
Panama City FL 32405-3721

Dear Ms Carmody:

The Eglin Air Force Base Natural Resource Branch (AAC/EMSN) is submitting this letter to address potential impacts to red-cockaded woodpeckers resulting from a Navy exercise that is scheduled for Spring 2004. The proposed action is to conduct up to two Composite Training Unit Exercises (COMPTUEX) and three advanced-phase Joint Task Force Exercises (JTFEX) at Eglin AFB per year. It includes the air-to-surface delivery of live bombs onto Eglin ranges involving the total complement of aircraft of the carrier group. This Biological Assessment, conducted by Eglin's Natural Resources Branch (EMSN), is meant to initiate the informal consultation process with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the Endangered Species Act.

Proposed Action
The Proposed Action is to conduct up to two COMPTUEX and three advanced-phase JTFEX at Eglin AFB per year. The COMPTUEX and JTFEX would not necessarily be conducted concurrently, and the training is anticipated to occur primarily between the months of December and May; however, this assessment will include potential impacts any time of the year. COMPTUEX training will require 9 days of Eglin Range operations over a 10-calendar day period, with the majority of operations taking place during the last 4 or 5 days of the operation, representing most of the second week of operations. JTFEX will require 3 days of Eglin Range operations over a 3-calendar day period. Years in which two COMPTUEX occur will require two 9-day periods of range operations; likewise, JTFEX will require up to three 3-day periods of range operations. It is possible that the training could occur only once during some years and not at all in others. This Biological Assessment (BA) will assess the impacts associated with training occurring at the maximum level, with the understanding that it may occur less frequently.

During the course of the exercise, live and inert ordnance would be expended by Navy aircraft onto eastern and western test areas of Eglin AFB. Small numbers of wheeled and tracked vehicles will be on the ranges for the COMPTUEX and JTFEX missions. Only established roads, trails, and bridges will be used for ground operations. Other facets of the exercise that include the use of Eglin AFB airspace, the expenditure of inert ordnance, and the expenditure of lesser amounts of live ordnance are routinely performed at Eglin and have not been found to have an impact on protected species. Therefore, the focus of this assessment is on the expenditure of live bombs and the ground movement involved in the exercises. The live munitions would be distributed between Test Areas A-77, B-70, B-82, C-52N, and C-72

(Figure 1). This Navy training exercise differs from previous exercises using live bombs because it will have a duration that spans over 9 days and increase the current level of bombing at Eglin AFB. The Natural Resource Branch is assessing impacts from this activity because of the longer duration of the event.

Note: Test Area B-70 is a back-up location and will be used only if there were an operational problem using the primary ranges C-52N and C-72. TA B-70 would have no significant increase in bombing operations and noise related issues. TA B-82 has smaller munitions and is not included in this assessment because current operations would not be significantly increased. Therefore, this assessment will center on potential impacts to TAs A-77, C-52N, and C-72.

Site Description and Species Information

TA A-77 - Test Area A-77 is an unscored tactical air-to-ground target area located approximately 20 miles west of Eglin Main. This target area is 3/4-mile-square and contains various tactical targets such as vehicle convoys, bivouac areas, and gun emplacement. Habitat classification is not indicated on the maps and sensitive species' locations are shown in Figure 2.

TA C-52 – Test Area C-52 is the largest test area on the Eglin reservation and is routinely used for bombing exercises. The use of C-52 as a bombing area has increased in recent years. During 1999, 168 bombs were dropped in a single day during a firepower demonstration. Other events on C-52 and other areas of Eglin generally have a short duration. The targets to be used for this training exercise are located on C-52N, which is an open grassland area that is maintained for military training and testing as a cleared area. Habitat classification is not indicated on the maps, and sensitive species' locations are shown in Figure 3.

TA C-72 – Test Area C-72 is a major cleared test area approximately 6 miles long. The C-72 complex is primarily used for air-to-ground and ground-to-ground missions involving the development or production testing of conventional munitions. Habitat classification is not indicated on the maps, and sensitive species locations are shown in Figure 4.

Okaloosa darter (Etheostoma okaloosae)

The Okaloosa darter is a small fish found in six small Choctawhatchee Bay Basin tributaries located in the Sandhills ecological association of the Eglin Mainland Reservation. The darter's diet consists primarily of immature aquatic insect larvae. Spawning occurs from March to October, with the greatest amount of activity taking place during April. The spawning occurs in beds of clean, current-swept macrophytes (large aquatic plants). Okaloosa darter habitat is sensitive to a variety of disturbances. Erosion can increase siltation and imperil the darter's habitat. Its range has also been reduced by habitat modification and encroachment by the brown darter. In order to protect the Okaloosa darter, the quantity and quality of water in the streams must be protected. Erosion control measures increase population. As indicated in the Population Monitoring of the Endangered Okaloosa Darter 2003 Annual Report, Eglin's Natural Resources restoration and erosion control has resulted in a profound improvement in habitat availability and an increase in Okaloosa darter counts. Eglin's Natural Resources division continues to provide better information about the success of environmental management, restoration, and conservation activities on Eglin AFB.

Flatwoods Salamander (Ambystoma cingulatum)

The flatwoods salamander is a small mole salamander that is about 5 inches in length when fully mature. Habitat for the flatwoods salamander consists mainly of open, mesic (moderate moisture) woodland of longleaf/slash pine flatwoods maintained by frequent fires. Adult flatwoods salamanders breed during the rainy season from October to December. Their breeding sites are isolated flatwoods depressions that dry completely on a cyclic basis and are generally shallow and relatively small. Since the salamander may disperse over long distances to and from breeding sites to upland sites where they live as adults, desiccation (drying out) can be a limiting factor in their movements. It is important that areas connecting their wetland and terrestrial habitats are protected in order to provide cover and appropriate moisture regimes during their migration. No known salamander ponds, ephemeral wetlands, dome swamps, or depression marshes are located near the test areas in this biological assessment; however, potential flatwoods salamander habitat is within the zone of influence and shown in Figure 2. Since the salamander may disperse over long distances to and from breeding sites to upland sites where they live as adults, desiccation (drying out) can be a limiting factor in their movements. As a result, it is important that areas connecting their wetland and terrestrial habitats are protected in order to provide cover and appropriate moisture regimes during their migration.

Eastern Indigo Snake (Drymarchon corais couperi)

The eastern indigo snake is the largest nonvenomous snake in North America and can grow up to 125 inches in length. The snake is a meat-eater (carnivorous) and will eat any animal up to about the size of a squirrel. Xeric Sandhill winter dens are used from December to April. From May to July they shift from winter dens to summer territories, and from August through November they are frequently located in shady creek bottoms. These seasonal changes in habitat encourage the maintenance of travel corridors that link these different habitat types. Although they use stump holes, armadillo and gopher holes, and other wildlife ground cavities, the eastern indigo snake is most strongly associated with gopher tortoise burrows. They use abandoned burrows in winter and spring for egg laying, shedding, and protection from dehydration and temperature extremes. Movement along travel corridors between seasonal habitats also exposes the snake to danger from increased contact with humans. From 1978 to 1999, Jackson Guard reported the sighting of 18 indigo snakes throughout the Eglin Mainland Reservation, based on FNAI element occurrences and incidental sightings. Many of these snakes were seen crossing roads or after being killed by vehicles.

Red-cockaded Woodpecker (Picoides borealis)

The red-cockaded woodpecker (RCW) inhabits the interstitial areas of the Eglin reservation. On Eglin, the RCW typically inhabits mature, open stands of longleaf pine. The RCW does not migrate and maintains year-round territories near nesting and roosting trees. Studies by DeLotelle et al. (1987) in central Florida found that RCWs foraged primarily in longleaf pine and pond cypress stands with dense ground cover of broomsedge bluestem (*Andropogon virginicus*). An RCW cluster typically encompasses about 10 acres with most cavity trees likely within a 1,500-foot diameter circle.

The woodpeckers primarily feed on spiders, ants, cockroaches, centipedes, and insect eggs and larvae that are excavated from trees. Dead, dying, and lightning-damaged trees that are infested

with insects are a preferred feeding source. The birds also feed on the fruits of black cherry (*Prunus serotina*), southern bayberry (*Myrica cerifera*), and black tupelo (*Nyssa sylvatica*).

High-quality RCW forage habitat consists of open pine stands with tree diameter at breast height averaging 9 inches and larger. While 100 acres of mature pine is sufficient for some groups, groups commonly forage over several hundred acres where habitat conditions are not ideal. The greatest threat to the RCW populations is loss and fragmentation of their habitat. As a result of active management, RCW populations on Eglin have continued to increase with the number of active clusters growing from an estimated 217 in 1994 to 313 in 2003.

Determination of Impacts

The proposed action would produce high levels of noise, bomb fragments, and heat/fire with the potential to affect wildlife, including sensitive species, and habitats that support those species. Impacts from noise described below are those that could occur if the test were to be carried out during any time of the year and under conditions absent of temperature inversions or winds. These conditions are considered ideal for minimizing noise impacts. Noise under these conditions spreads out in roughly spherical fashion, whereas in the presence of winds and inversions, noise contours may be irregular and extend over much greater distances. Wildfires could result from the heat of the explosion or from hot bomb fragments. Bomb fragments would have the potential to directly impact wildlife or habitats.

Okaloosa Darter

All proposed targets are outside of an Okaloosa darter stream drainage basin except for TA C-72. TA C-72 has two Okaloosa darter streams running northeast to southwest in the middle of the test area (Figure 4). The closest target to the stream is approximately 500 feet away and all targets are placed on level land (less than 5 percent gradient). Tracked and wheeled vehicles will remain on existing roads that are authorized for this activity. Bomb fragments are not anticipated to impact the stream or stream basin. These targets have been used for bombing in the past and no impacts have occurred. Erosion into the stream due to soil disturbance is unlikely due to little to no slope gradient and bomb fragments entering the stream are unlikely. Navy Pre-Deployment training activities at Eglin AFB are NOT LIKELY TO ADVERSELY AFFECT Okaloosa darter individuals or populations. However, if a munition does directly or indirectly impact a stream, Eglin Natural Resources personnel will be contacted to advise in the removal operations.

Flatwoods Salamander

Potential flatwoods salamander habitat is scattered in numerous interstitial areas of Eglin AFB, including concentrations near TA A-77 (Figure 2). Most of the confirmed flatwoods salamander habitat on Eglin Air Force Base and Hurlburt Field is concentrated further south of TA A-77. Navy ground movement will not traverse confirmed or potential flatwoods salamander habitat. Tracked and wheeled vehicles will remain on existing roads that are authorized for this activity. Noise is not anticipated to impact salamanders. Fire is not expected and bomb fragments are not anticipated to impact potential flatwoods salamander habitat. Navy Pre-Deployment training activities at Eglin AFB are NOT LIKELY TO ADVERSELY AFFECT flatwoods salamander habitat, individuals, or populations.

Eastern Indigo Snake

The only real potential impact to the eastern indigo snake is from direct physical impacts associated with ground movement on the Eglin Mainland Reservation. Incidental contact with troops on foot and vehicles could result in trampling or crushing of individuals. However, this occurrence is unlikely, as a snake would most likely move away from the area if it sensed a general disturbance in its vicinity. Minimization procedures that would be employed to minimize impacts to the eastern indigo snake from ground movement associated with Navy Pre-Deployment missions include instructions that should an indigo snake be sighted, activities would cease and the snake would be allowed sufficient time to move away from the site on its own before Navy personnel resumed activities. Navy Pre-Deployment activities are NOT LIKELY TO ADVERSELY AFFECT the eastern indigo snake.

Red-cockaded Woodpecker

Fire

Fire resulting from the explosion and dispersal of hot bomb fragments could burn important habitats adjacent to test areas. The sandhill ecological community adjacent to many test areas is forage habitat for the RCW, and several active cavity trees are present. Much of the area near test areas has been burned within the last five years from controlled or prescribed burns that were initiated by the Eglin Natural Resources Branch to maintain the health of sandhill habitats. Thus, fire under the proper conditions could have a beneficial effect on habitats around test areas. Fire eliminates vines, underbrush, and dead plant matter, allowing space for the growth of pines, while promoting the growth of grasses and herbs, a food source for birds and other animals.

For the proposed action, the most likely place for a wildfire to start would be within the 2,500-foot fragment hazard area in the surrounding sandhill habitat. Fire may result in negative impacts to sandhill habitat only in areas that have not been burned within the last few years and/or if fires occur under dry conditions. These conditions typically would occur from September through October and April through June. Such conditions result in "hot" fires that could damage normally fire-resistant longleaf pines.

The probability of a fire occurring is unknown; however, if started, wildfires would likely originate within the hazard area. During the past COMPTUEX and JTFEX exercises at Eglin AFB, no fires occurred due to mission-related bombing. Navy Pre-Deployment activities are NOT LIKELY TO ADVERSELY AFFECT the RCW due to potential fires.

Bomb Fragments

According to the Eglin Safety Office, it is reasonable to assume that 95 percent of non-guided munitions fall within 500 feet of their intended target. The estimated maximum fragment travel distance for an Mk-82, Mk-83 and Mk-84 is 7,400 feet with the majority of fragments falling within 2,500 feet. Most of the fragments would remain on the Test Areas and would not pose a significant threat to sensitive species at or beyond the perimeter of the test area. Guided versions of the above bombs, GBU-12s, GBU-16s, GBU-31s and GBU-32s, would also be used and are more accurate.

The potential for impacts to RCWs from flying fragments is low. In addition, the buffer materials and targets used in the test would intercept a percentage of the low trajectory, high velocity fragments that could pose the greatest threat to sensitive resources along the perimeter of the test areas. Active cavity trees within the hazard area would be less susceptible to fragment impacts given that they are located deeper in the woods. Since most of the fragments would remain on the test area, even the risk to resources along the perimeter is minimal. No loss of habitat would result from a fragment striking a tree, and the probability of a fragment striking an individual organism would be very remote. However, fragments traveling this "worse case" distance are unusual and unlikely to impact RCWs. Thus, the greatest concern for potential impacts to RCWs is associated with noise. Navy Pre-Deployment activities are NOT LIKELY TO ADVERSELY AFFECT the RCW due to bomb fragments.

Noise

Potentially harmful levels of noise could extend outward to active cavity trees (Figures 2-4). Although brief, exposure to this noise carries a risk of acoustic discomfort, and RCWs at the closest cavity trees of the detonation sites would be exposed to noise above 140 dBP. Similar exposures are likely occurring on occasion throughout the test area and other test areas on the reservation with no known detrimental impacts on the overall population. Eglin natural resource personnel have observed no difference in RCW productivity or survival from those clusters located near an active range or those far away. Compared to noise, habitat quality seems to be more influential in determining RCW productivity, survival, and population stability.

RCWs continue to thrive in noisy test areas and exist near B-70 in areas exposed to 154 dBP from sonic booms. Still, the potential for noise impacts to RCWs exists and could result in nonlethal harassment. RCWs would be most sensitive during nesting season; noise could directly affect eggs and could cause nest abandonment by adults. RCW nesting season is listed as being from 1 April to 1 July of each year. Therefore, it is recommended that testing be conducted outside of the nesting season from July through March to minimize potential impacts; however, this assessment addresses potential impacts any time of the year. It should also be noted that when not nesting, adult RCWs may be anywhere within the forage area during the day.

Historic COMPTUEX and JTFEX Noise Data: In March of 2000, a component of COMPTUEX/JTFEX pre-deployment training was conducted at Eglin AFB. The surge component training requirement of expending the entire live ordnance complement of a carrier was met by expending 250 live Mk-82s in one day at Eglin AFB. Because the Navy expressed a desire to conduct this training at Eglin in the future, additional data was collected to assist in making a determination of impacts. Therefore, an effort was made to collect noise data during this event. The noise data was used to determine the accuracy of the model and also to understand noise shielding that occurs from the forest structure. The Natural Resource Branch attempted to monitor RCW response to the event. However, because the cavity trees closest to the targets were within the safety exclusion zone, it was not possible to have personnel present during the training exercise. RCW response for those areas outside of the safety exclusion zone was completed.

On March 24, 2000 Eglin Air Force Base supported the U.S. Navy COMPTUEX and JTFEX Training Mission at Test Range C-52N. Noise contours were model-generated to assess impacts to RCWs at TA C-52N. This modeling showed that the cavity trees closest to the target area would be exposed to noise levels between 120 and 125 peak decibels. In compliance with the Biological Assessment data collection requirements, noise-monitoring equipment, provided by bio-environmental engineering, was placed next to active cavity trees in four different clusters at varying distances from the test site. This was done to detect actual noise levels during the testing. In addition to noise monitoring equipment, motion sensitive cameras where placed near four active cavity trees to determine RCW movement during the bombing. All four active clusters, where noise monitors and cameras were placed, were monitored pre- and post-test to determine group size (number of RCWs occupying the cluster of cavity trees). One additional group was also monitored for group size before and after the test, but noise recorders or cameras were not placed in this cluster due to its proximity to one of the other clusters with a camera and noise recorder. Group size monitoring involves being in the cluster early in the morning to observe the RCWs emerging from their roost trees. The birds are observed and followed until the total number of birds in the social unit can be determined.

The highest recorded peak noise level recorded was 141 dB for one bomb out of 250 adjacent to the range boundary. All four clusters had the same group sizes before and after the test and most of the birds were roosting in the same cavity trees. It was concluded from this monitoring that the noise levels generated by this testing did not cause the death of any RCWs, abandonment of any clusters, or birds to roost away from their cavity trees. This work was conducted by biologists from the Natural Resources Branch (Jackson Guard).

Historic Noise data on C-72: A detonation of 15,000-pounds NEW occurred at TA C-72 in July 1999 under good weather conditions. A set of measurements was taken in the vicinity of active RCW trees outside of TA C-72. These measurements approximated 150 dBP. Observations made by the Natural Resources Branch personnel noted that the presence of RCWs and bird behavior at two active cavity trees in the vicinity of these noise measurements were similar between the day before the detonation and the day following the detonation. Therefore, it is assumed that the noise level approximating 150 dBP from the detonation did not have a short-term negative impact on RCW behavior in the vicinity. The locations of these measurements corresponded to a modeled noise level between 140 and 150 dBP.

Analysis and Impacts - A total of 264 GBU-12s/Mk-82s, GBU-16s/GBU-32s/ Mk-83s, and GBU-31/Mk-84s would be detonated per COMPTUEX on targets at Test Areas C-52N, A-77, and C-72. Noise from these detonations was modeled in order to predict potentially harmful noise exposure to RCWs.
Test Area A-77: Approximately 48 inactive RCW cavity trees and 14 active RCW cavity trees would be exposed to noise > 140 dBP. A review of expended items on the test area from 1998 to 2001 indicates the largest net explosive weight munition recently used at this test area was a rocket with 25 pounds of explosive, which was fired twice in 1998. The detonations proposed from Navy Pre-Deployment Training would increase the net explosives and frequency of detonations on TA A-77. However, Navy Pre-Deployment missions are NOT LIKELY TO ADVERSELY AFFECT RCWs at TA A-77 given that RCWs continue to thrive in noisy test areas and exist in areas exposed to 154 dBP from sonic booms. Past studies show no difference in RCW productivity or survival from those clusters located near an active range or those far

away, and COMPTUEX historic noise data show no death of any RCWs, abandonment of any clusters, or birds to roost away from their cavity trees.

Test Area C-52N: Potentially harmful levels of noise from bombs delivered onto targets at C-52N would not reach RCW cavity trees. The nearest cavity tree is located over 4,000 feet away and would be exposed to between 130 and 125 dBP from an Mk-83 detonation. Figure 3 presents the potential noise impacts to RCWs for TA C-52N. Typically, the number of annual detonations on TA C-52N ranges between from 100 and to 300 bombs with a net explosive weight of 200 pounds or greater. Thus it is unlikely that RCWs would experience any new noise from the Navy exercises at TA C-52N outside of the norm for this area. Navy Pre-Deployment missions are NOT LIKELY TO ADVERSELY AFFECT RCWs at TA C-52N.

Test Area C-72: Approximately 20 inactive RCW cavity trees and 5 active RCW cavity trees would be exposed to noise > 140 dBP. There would not be a substantial increase in net explosive and frequency of detonations at this test site. Maverick missile detonations have been previously analyzed and potential impacts from Hellfire missiles have also been assessed with no adverse noise effects to RCW clusters near the targets. Navy Pre-Deployment missions are NOT LIKELY TO ADVERSELY AFFECT RCWs at TA-C-72 given that RCWs continue to thrive in noisy test areas and exist in areas exposed to 154 dBP from sonic booms. Past studies show no difference in RCW productivity or survival from those clusters located near an active range or those far away, and COMPTUEX historic noise data show no death of any RCWs, abandonment of any clusters, or birds to roost away from their cavity trees.

Active RCW clusters are found near each of the test areas proposed for Navy Pre-Deployment testing. However, because each test area is maintained as an open grassland habitat, it is unlikely that it is actually used as foraging habitat by RCWs. RCW nesting season is listed as being from 1 April to 1 July of each year. The earliest documented RCW nesting activity at Eglin occurred on 5 April, and generally nesting begins around the 3rd week of April. The potential exists for RCWs to leave the area due to noise, return, and then leave again when bombing resumes. This could occur repeatedly through the day. If this event were scheduled during RCW nesting season, impacts to RCWs could occur in association with this test if nesting birds were scared from the area for the duration of the training exercise. Bombing does occur routinely on C-52N, and no adverse impacts to RCW productivity in this area have been observed. Because RCWs continue to thrive in noisy test areas, the nearest cavity trees are located on the border of the 140 dBP impact zone, and bombing routinely occurs on these test areas, the Natural Resource Branch has made a determination that this proposed training is NOT LIKELY TO ADVERSELY AFFECT red-cockaded woodpeckers.

Conclusion

Impacts from fire and bomb fragments are possible but considered remote due to the distance of the closest active RCW cavity trees, potential flatwoods salamander habitat, eastern indigo snake, and Okaloosa darter streams from the proposed detonation site. In addition, fire may have overall beneficial impacts on RCW habitat. Given the increase in numbers of the western sub-population of RCWs on Eglin AFB, the management of longleaf pine habitat, and given that habitat and not noise is a primary limiting factor for RCW population stability, no long-term effects to RCWs are expected from the proposed action. However, noise levels reaching the closest active cavity trees could result in non-lethal harassment.

The U.S. Fish and Wildlife Service will be notified immediately if any of the actions considered in this biological assessment are modified or if additional information on listed species becomes available, as a re-initiation of consultation may be required. If impact to listed species occurs beyond what has been considered in this assessment, all operations will cease and the Service will be notified. Any modifications or conditions resulting from consultation with the Service will be implemented prior to commencement of activities. The Natural Resources Branch believes this fulfills all requirements of the Endangered Species Act and no further action is necessary.

Sincerely

Stephen M. Seiber, GS-13
Chief, Natural Resource Branch

Attachments:
Figures 1-5

INFORMAL CONSULTATION REGARDING

IMPACTS TO FEDERALLY LISTED SPECIES RESULTING F ROM COMPOSITE TRAINING UNIT EXERCISES (COMPTUEX) and JOINT TASK FORCE EXERCISES (JTFEX) ON EGLIN AIR FORCE BASE, FL

Prepared by: _____ _____
Mike Nunley Date
Environmental Scientist
SAIC

Reviewed by: _____ _____
Bob Miller Date
Endangered Species Biologist
Eglin Natural Resources Branch

_____ _____
Bruce Hagedorn Date
Chief, Fish and Wildlife Section
Eglin Natural Resources Branch

_____ _____
James Seyler Date
Navy Representative

_____ _____
Stephen Seiber Date
Chief, Eglin Natural Resources Branch

USFWS Concurrence: _____ _____
Project Leader Date
Fish and Wildlife Biologist
U.S Fish and Wildlife Service

_____
FWS Log No.

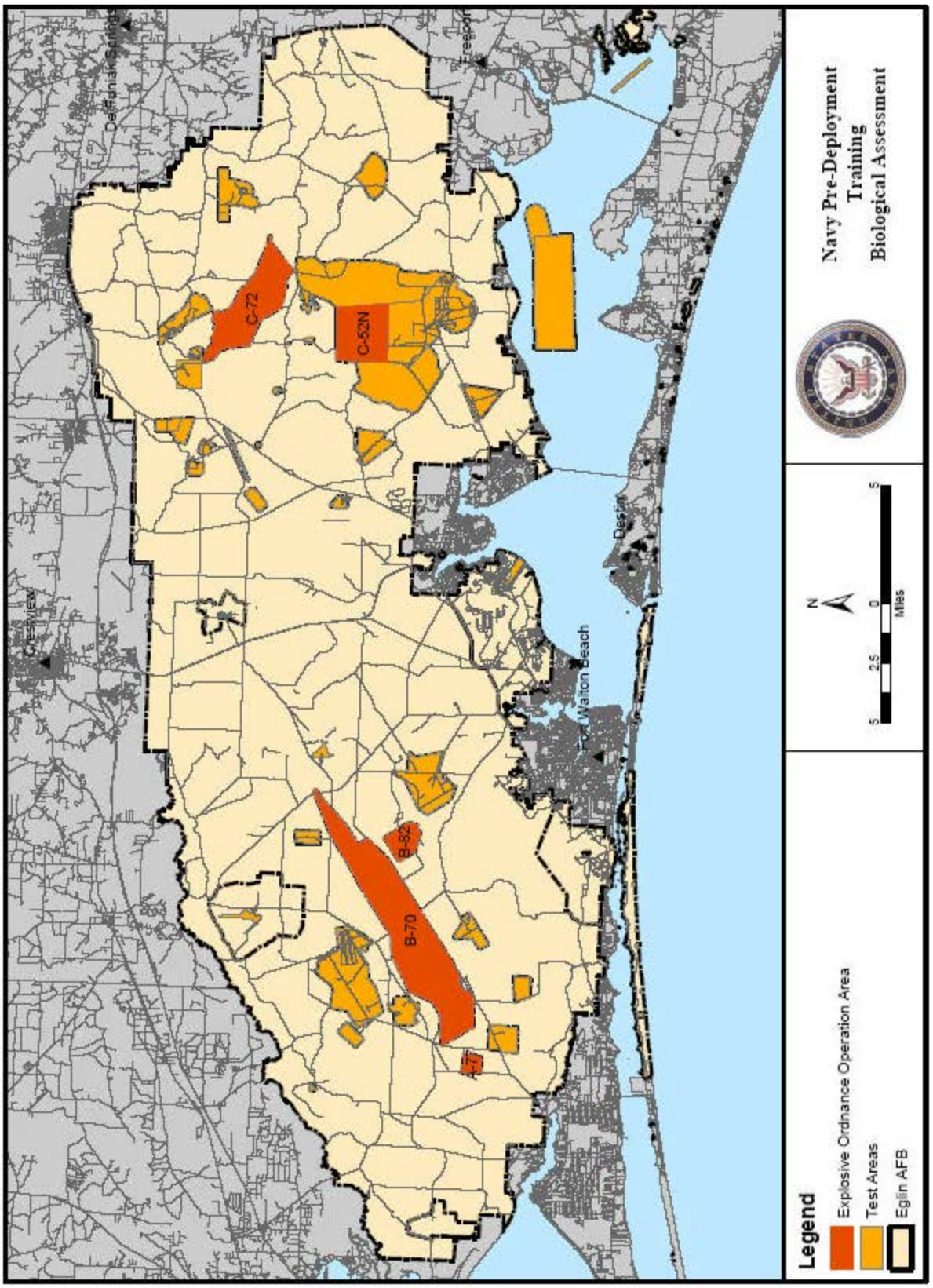

Figure 1. Proposed Live Ordnance Use Areas.

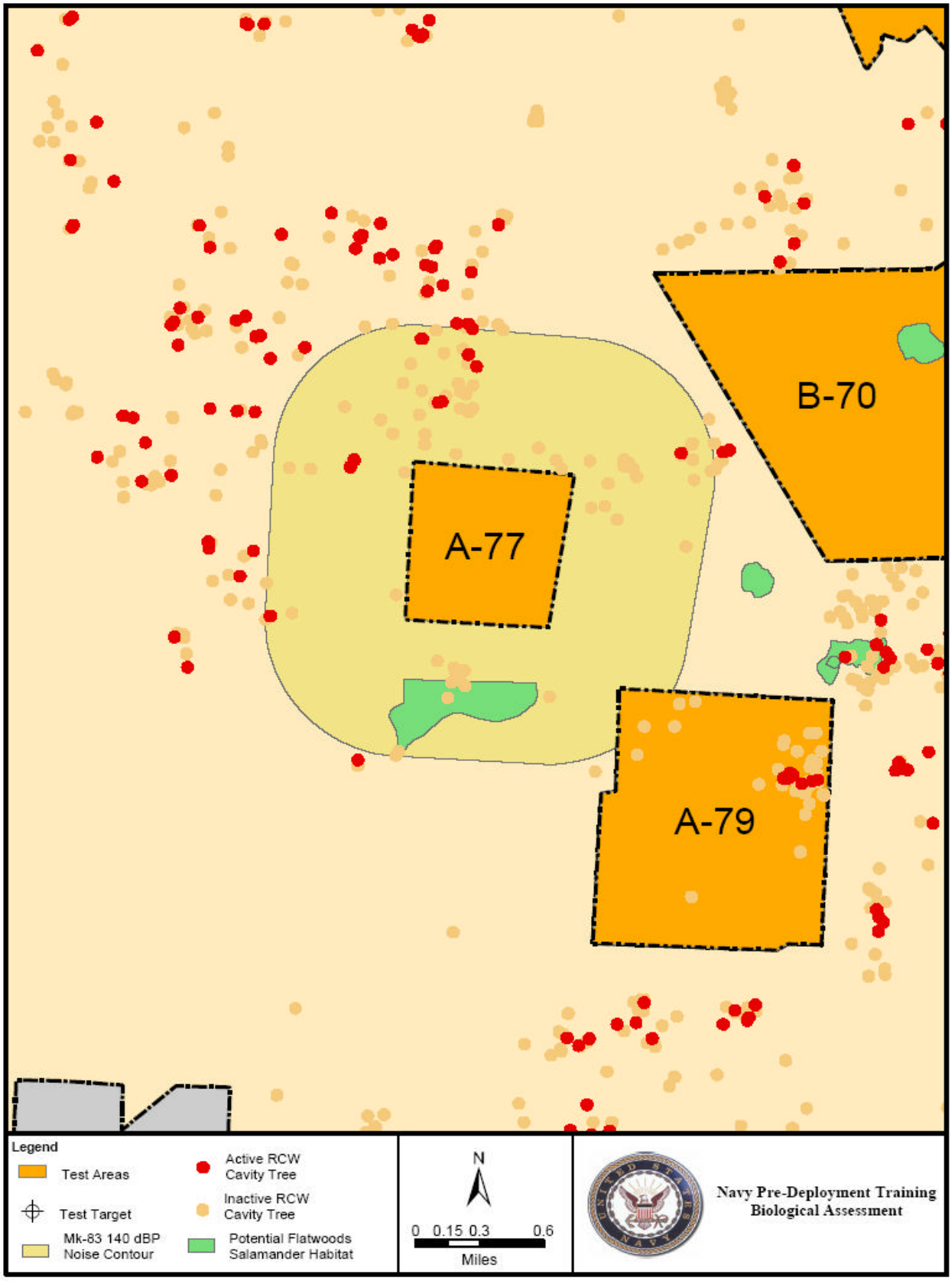

Figure 2. Test Area A-77 Sensitive Species Locations

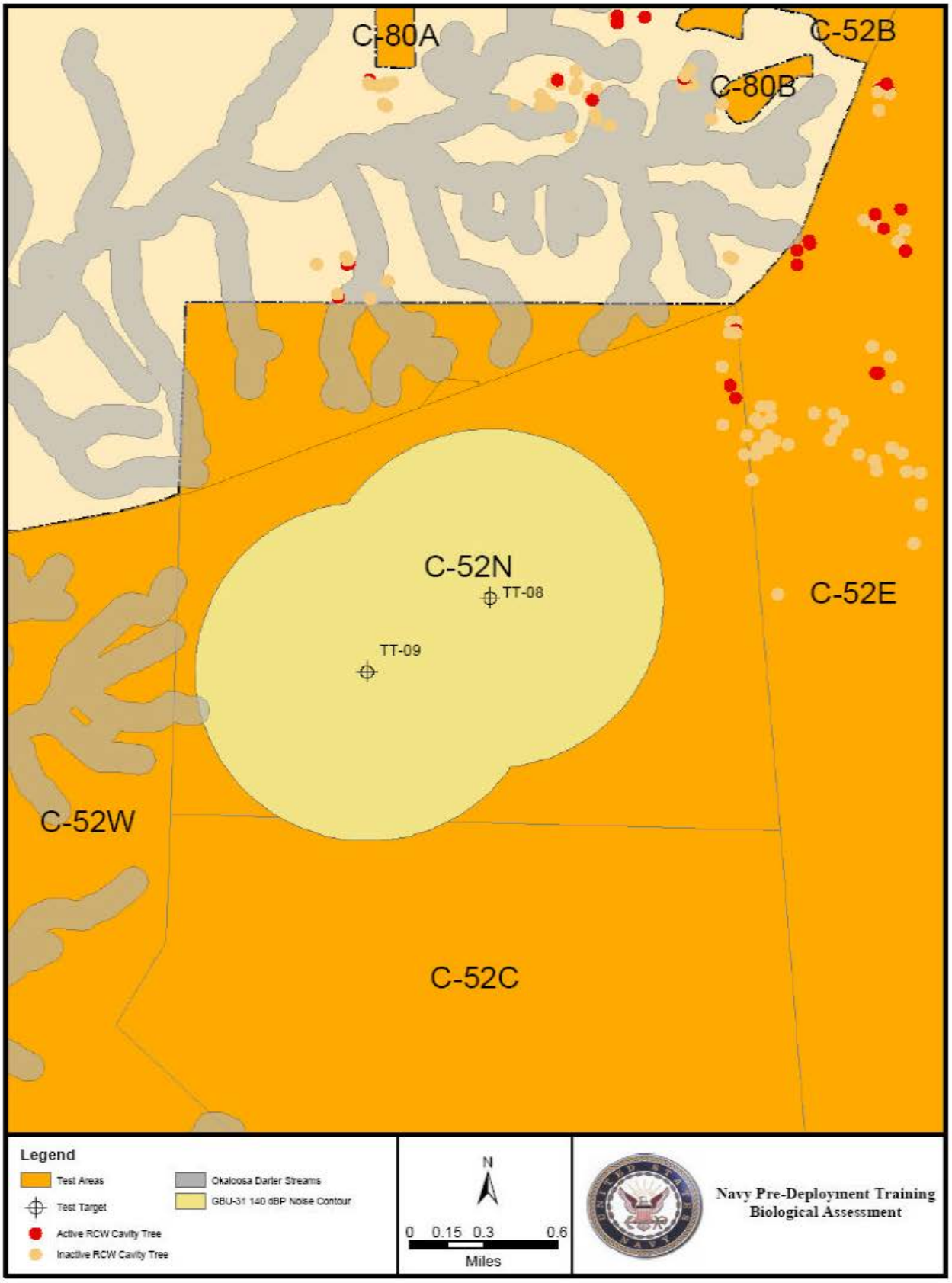

Figure 3. Test Area C-52N sensitive species locations.

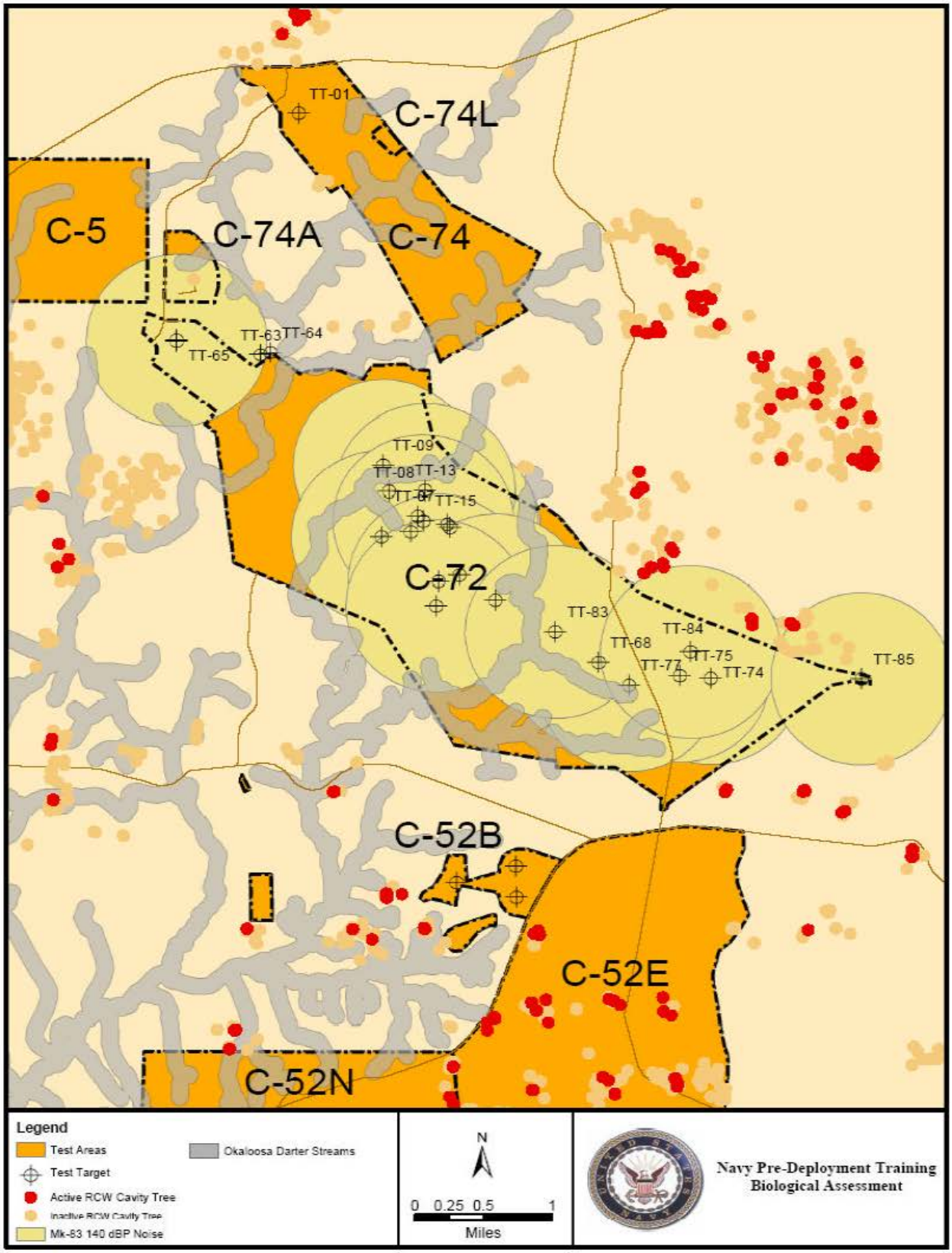

Figure 4. Test Area C-72 Sensitive Species Locations

02/03/04 TUE 08:53 FAX 680 7652177 U.S. Fish and Wildlife 8507935321 P.2
Jan 30 04 01:05p SAIC

INFORMAL CONSULTATION REGARDING

IMPACTS TO FEDERALLY LISTED SPECIES RESULTING FROM COMPOSITE TRAINING UNIT EXERCISES (COMPTUEX) and JOINT TASK FORCE EXERCISE (JTFEX) ON EGLIN AIR FORCE BASE, FL

Prepared by: _____ 30 JAN 04
Mike Nunley
Environmental Scientist
SAIC
Date

Reviewed by: _____ 30 Jan 04
Bob Miller
Endangered Species Biologist
Eglin Natural Resources Branch
Date

_____ 30 Jan 04
Bruce Hagedorn
Chief, Fish and Wildlife Section
Eglin Natural Resources Branch
Date

_____ 30 Jan 04
Stephen Seiber
Chief, Eglin Natural Resources Branch
Date

USFWS Concurrence: _____ 2-2-04
Project Leader
Fish and Wildlife Biologist
US Fish and Wildlife Service
Date

DEPUTY

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